

Rear Differential

Rear Differential

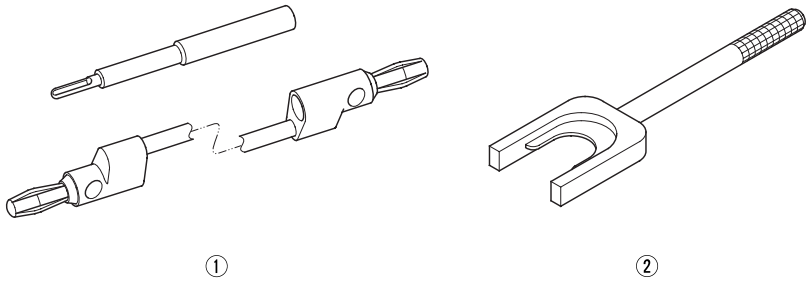
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Rear Differential

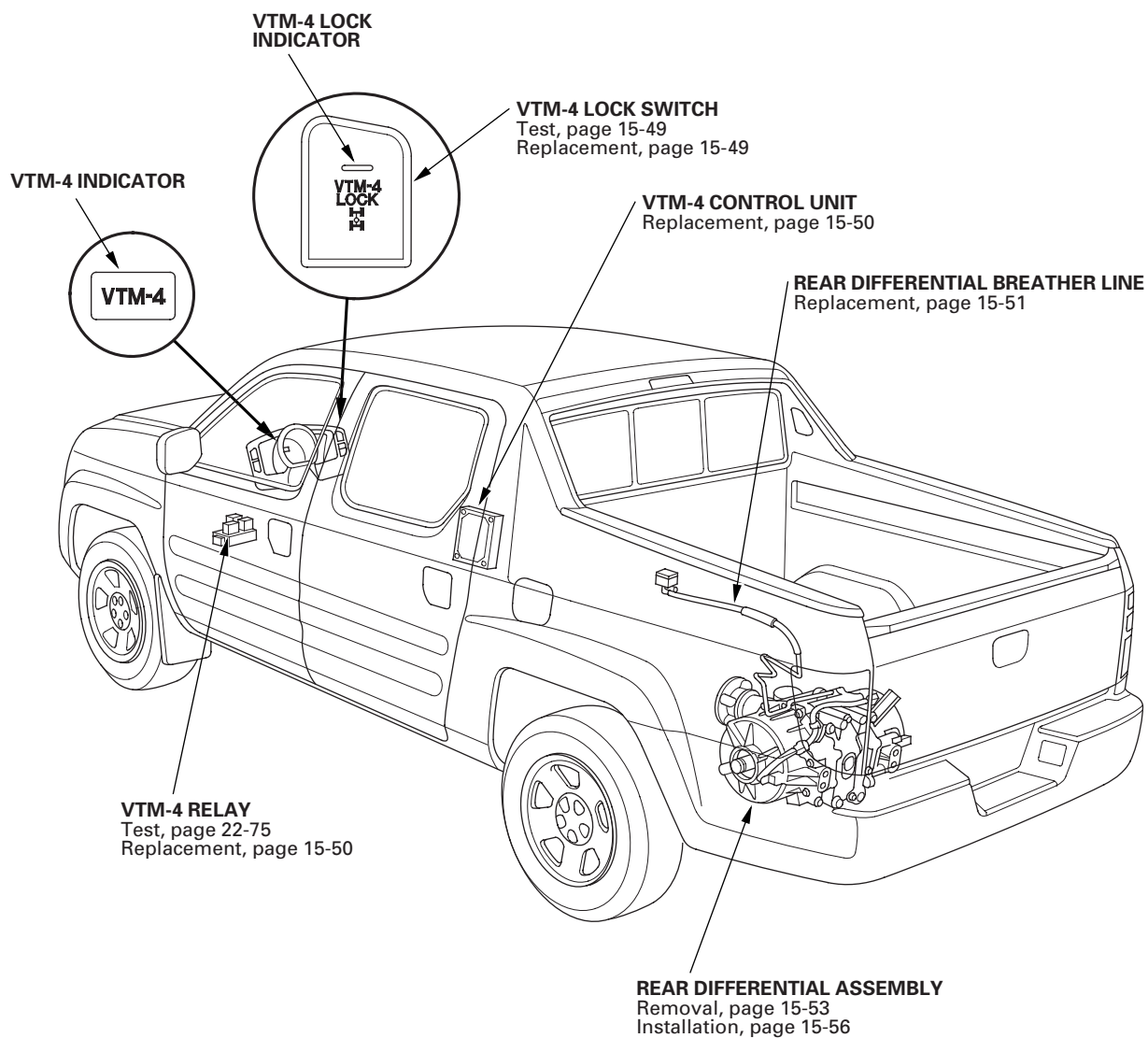
Special Tools

Ref. No.	Tool Number	Description	Qty
①	07SAZ-001000A	Backprobe Set	2
②	07AAD-S9VA000	Driveshaft Remover	1





Component Location Index



Rear Differential

General Troubleshooting Information

VTM-4 Indicator

The VTM-4 indicator comes on under certain conditions even if the 4WD system is working normally. Here are some examples:

- When you use high-powered wireless equipment such as a CB or Ham radio in the vehicle.
- When you keep spinning the front wheels while the vehicle is stuck in sand, mud, snow, etc.
- When the battery voltage suddenly drops below 8 volts or rises above 16 volts.

After the VTM-4 indicator comes on, it stays on until you turn the ignition switch off.

Diagnostic Trouble Code (DTC)

- The VTM-4 control unit can memorize up to seven different DTCs. The system displays the DTCs by blinking the VTM-4 indicator. Multiple DTCs are displayed in the order they occurred, beginning with the most recent.
- If the same DTC is detected more than once, the most recent DTC is written over the earlier one. Therefore, when the same problem is detected more than once, it is memorized as a single DTC.
- The DTCs are memorized in the EEPROM (non-volatile memory). Therefore, the memorized DTCs are not cleared when the battery is disconnected or the VTM-4 control unit is disconnected.
- If there is a problem in the central processing unit (CPU) of the VTM-4 control unit, the VTM-4 indicator comes on, but no DTC is memorized.

Self-diagnosis

When a problem is detected by self-diagnosis, the system does the following:

- Turns the VTM-4 indicator on.
- Memorizes the DTC.
- Stops 4WD control and puts the vehicle back in 2WD (FWD).
- Reduces engine torque to suit the driving conditions when the abnormality was detected.



Initialization of the VTM-4 Control Unit

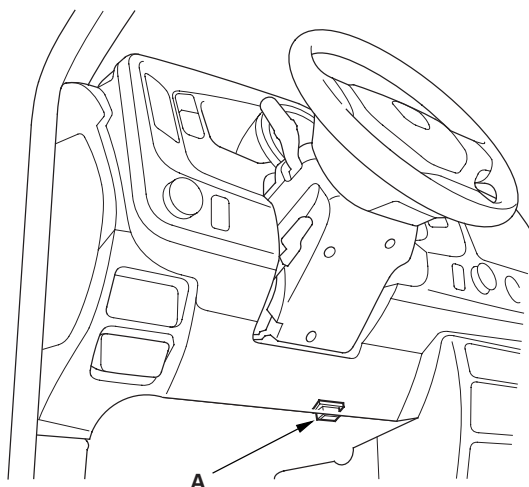
Whenever the VTM-4 control unit is replaced, it must be initialized to make the 4WD system function.

There are two methods used to initialize the VTM-4 control unit. The recommended method is to use the Honda Diagnostic System (HDS) with the appropriate software plugged into the data link connector (DLC).

The other method is to initialize the VTM-4 control unit manually.

Initialization with the HDS

1. With the ignition switch OFF, connect the HDS to the data link connector (DLC) (A) (located behind the driver's dashboard lower cover).

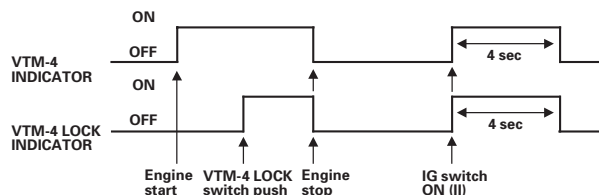


2. Make sure the HDS communicates with the VTM-4 control unit. If it doesn't go to the DLC circuit troubleshooting (see page 11-194).
3. Turn the ignition switch ON (II), and follow the prompts on the HDS screen.

NOTE: See the HDS user's manual for specific instruction.

Manual Initialization

1. Start the engine (the VTM-4 indicator comes on, and the VTM-4 LOCK switch indicator is off).
2. Apply the brakes, and move the shift lever to either R, 1, or 2, then push the VTM-4 LOCK switch (the VTM-4 indicator stays on, and the VTM-4 LOCK switch indicator is on). The 4WD system is now in lock mode.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON (II) (the VTM-4 indicator and the VTM-4 LOCK indicator both come on for 4 seconds, then go off). The VTM-4 control unit is initialized.



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Rear Differential

General Troubleshooting Information (cont'd)

How to Check for DTCs

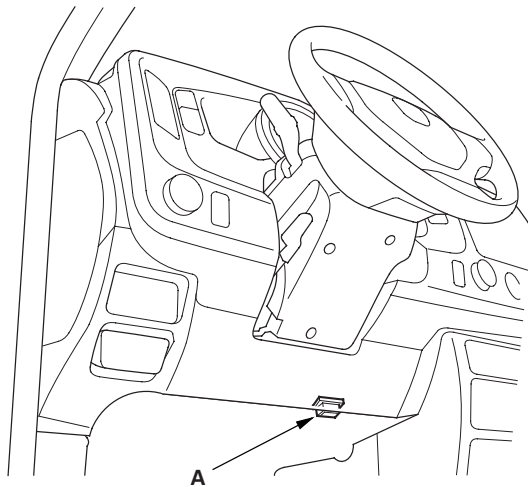
When the VTM-4 control unit senses an abnormality in the input or output systems, the VTM-4 indicator in the gauge control module will usually come on, and the malfunction indicator lamp (MIL), the D5 indicator, and/or the VSA indicator may also come on.

There are two methods used to check for DTCs. The recommended method is to use the HDS with the appropriate software plugged into the data link connector (DLC).

The other method is to connect the service check signal (SCS) circuit with the HDS. When the data link connector (DLC) is connected to the HDS, the VTM-4 indicator will blink the diagnostic trouble code (DTC) when the ignition switch is turned ON (II) and the SCS circuit is connected to body ground.

HDS Method

1. With the ignition switch OFF, connect the HDS to the data link connector (DLC) (A) (located behind the driver's dashboard lower cover).



2. Make sure the HDS communicates with the VTM-4 control unit. If it doesn't go to the DLC circuit troubleshooting (see page 11-194).

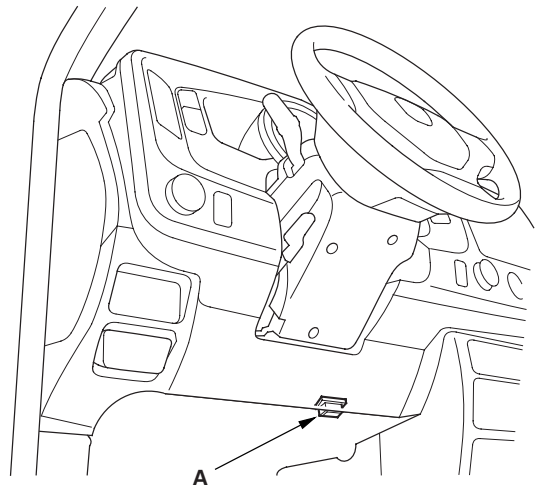
3. Turn the ignition switch ON (II), and follow the prompts on the HDS to display the DTC(s) on the screen. After determining the DTC(s), refer to the DTC Troubleshooting.

NOTE: See the HDS user's manual for specific instruction.

4. If there are fuel and emissions DTCs, A/T DTCs, or VSA DTCs at the same time, troubleshoot the fuel and emissions DTCs first, then A/T DTCs second, then VSA third, and then VTM-4 last.
5. After recording the DTCs, clear all DTCs.
6. Test-drive the vehicle for several minutes in 4WD mode, and check for DTCs. If the DTC returns, refer to the DTC Troubleshooting. If the DTC does not return, there was an intermittent problem within the circuit. Make sure all connectors and terminals in the circuit are tight.

Service Check Signal Circuit (SCS) Method

1. Park the vehicle on level ground. Shift to P, then turn off the engine.
2. Release the parking brake pedal.
3. With the ignition switch OFF, connect the HDS to the data link connector (DLC) (A) (located behind the driver's dashboard lower cover).

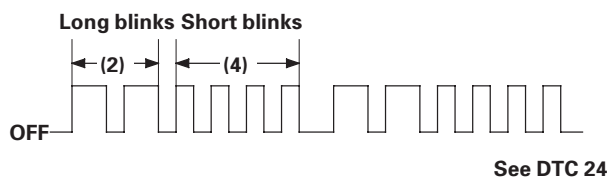


4. Short the SCS circuit to body ground with the HDS.



5. Turn the ignition switch ON (II), and observe the VTM-4 indicator.

NOTE: Codes above 10 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the DTC Troubleshooting.



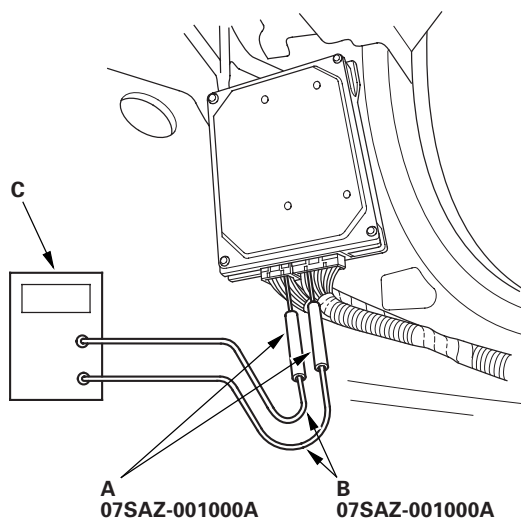
6. Record all the DTC(s), then refer to the DTC Troubleshooting to determine the meaning of each DTC.
7. Clear the DTCs from the VTM-4 control unit memory.
8. If the MIL, D5 indicator, or the VSA indicator all come on at the same time, troubleshoot the cause for the MIL first, then A/T DTCs second, then VSA third, and then VTM-4 last.
9. Test-drive the vehicle for several minutes in 4WD mode, and check for DTCs.
If the DTC returns, refer to the DTC Troubleshooting.
If the DTC does not return, there was an intermittent problem within the circuit. Make sure all connectors and terminals in the circuit are tight.

How to Troubleshoot Circuits at the VTM-4 Control Unit

Special Tools Required

Backprobe set 07SAZ-001000A (two required)

1. Remove the right side kick panel (see page 20-60) to gain access to the VTM-4 control unit.
2. Inspect the circuit on the VTM-4 control unit according to the DTC Troubleshooting using the special tools and a digital multimeter or an analog circuit tester.
3. Connect the backprobe adapters (A) to the stacking patch cords (B), and connect the cords to the multimeter or an analog circuit tester (C). Using the wire insulator as a guide for the contoured-tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wires.



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Rear Differential

General Troubleshooting Information (cont'd)

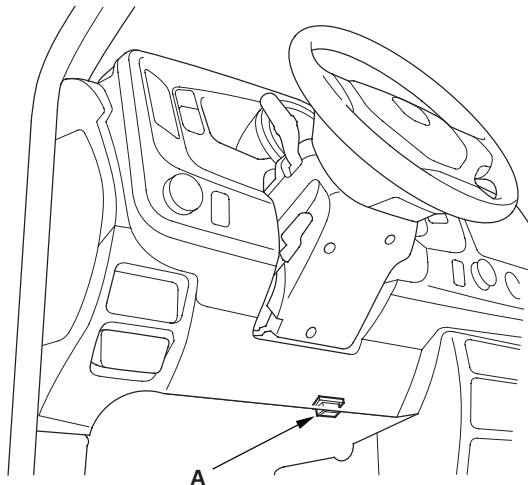
How to Clear the VTM-4 Control Unit Memory

There are two methods used to clear DTCs from the VTM-4 control unit memory. The recommended method is to use the HDS with the appropriate software plugged into the data link connector (DLC).

The other method is to connect the service check signal (SCS) connector with the HDS, and manually clear the memory.

HDS method

1. With the ignition switch OFF, connect the HDS to the data link connector (DLC) (A) (located behind the driver's dashboard lower cover).

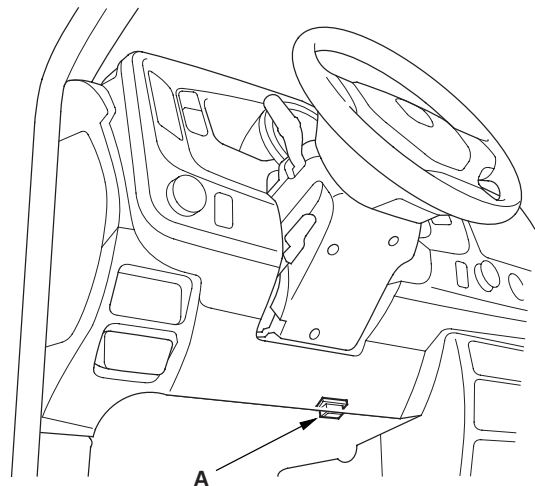


2. Make sure the HDS communicates with the VTM-4 control unit. If it doesn't go to the DLC circuit troubleshooting (see page 11-194).
3. Turn the ignition switch ON (II), and follow the prompts on the HDS screen to clear the DTC(s).

NOTE: See the HDS user's manual for specific instruction.

Service Check Signal Circuit (SCS) Method

1. Park the vehicle on level ground. Shift to P, then turn off the engine.
2. Release the parking brake pedal.
3. With the ignition switch OFF, connect the HDS to the data link connector (DLC) (A) (located behind the driver's dashboard lower cover).



4. Short the SCS circuit to body ground with the HDS.
5. Turn the ignition switch ON (II).
6. The VTM-4 indicator comes on and stays on for 4 seconds. Press and hold the VTM-4 LOCK switch while the VTM-4 indicator is on.
7. When the VTM-4 indicator goes off, release the VTM-4 LOCK switch.
8. The VTM-4 indicator comes on and stays on for 4 seconds. Press and hold the VTM-4 LOCK switch while the VTM-4 indicator is on.

Rear Differential

DTC Troubleshooting Index

DTC*	VTM-4 Indicator	Detection Item	Possible Cause	Page
21-1	ON	Left-front wheel sensor	• Sensor is defective • Open or short in the wire harness • VTM-4 control unit is defective • VSA modulator-control unit is defective	(see page 15-20)
22-1	ON	Right-front wheel sensor		
23-1	ON	Left-rear wheel sensor		(see page 15-22)
24-1	ON	Right-rear wheel sensor		
26-1	ON	VSA modulator-control unit or wire harness	• Open or short in the wire harness from the VTM-4 control unit to VSA modulator • VSA modulator-control unit is defective	(see page 15-24)
37-1	ON	Engine RPM signal circuit	• Open or short in the wire harness • VTM-4 control unit or PCM is defective	(see page 15-25)
38-1	ON			
41-1	ON	CAN communication (PCM/VSA system)	• Open or short in the wire harness from the VTM-4 control unit to PCM/VSA • VTM-4 control unit or PCM is defective or VSA modulator-control unit is defective	(see page 15-27)
42-1	ON	Differential oil temperature sensor	• Sensor is defective • Open or short in the wire harness • VTM-4 control unit is defective	(see page 15-29)
43-1	ON			
44-1	ON	VTM-4 relay	• Relay is defective • Open or short in the wire harness • VTM-4 control unit is defective	(see page 15-30)
51-1	ON	Left clutch electromagnetic coil	• Electromagnetic coil is defective • Open or short in the wire harness • VTM-4 control unit is defective	(see page 15-32)
52-1	ON			
53-1	ON			
54-1	ON			
55-1	ON	Right clutch electromagnetic coil	• Electromagnetic coil is defective • Open or short in the wire harness • VTM-4 control unit is defective	(see page 15-34)
56-1	ON			
57-1	ON			
58-1	ON			
59-1	ON	Right/left clutch electromagnetic coil power supply	• Low battery voltage • Fault in the charging system • VTM-4 control unit is defective	(see page 15-37)
73-1	ON	MAP (manifold absolute pressure) sensor or PCM	• Fault in the PCM system/MAP (manifold absolute pressure) sensor is defective	(see page 15-37)
76-1	ON	Rear differential clutch warning system	• Sensor is defective • Open or short in the wire harness • VTM-4 control unit is defective • VSA modulator-control unit is defective	(see page 15-38)
77-1	ON	PCM	• PCM is defective	(see page 15-40)
78-1	ON	VTM-4 control unit	• VTM-4 control unit is defective	(see page 15-40)
41-2	ON	CAN communication (PCM/VSA system)	• Open or short in the wire harness from VTM-4 control unit to PCM (or VSA)	(see page 15-27)
42-2	ON	Differential oil temperature sensor	• Sensor is defective • Open or short in the wire harness • VTM-4 control unit is defective	(see page 15-29)
21-2	ON	Left-front wheel sensor	• Sensor is defective • Open or short in the wire harness • VTM-4 control unit is defective • VSA modulator-control unit is defective	(see page 15-20)
22-2	ON	Right-front wheel sensor		
23-2	ON	Left-rear wheel sensor		(see page 15-22)
24-2	ON	Right-rear wheel sensor		
53-2	ON	Left or Right clutch electromagnetic coil	• Electromagnetic coil is defective • Open or short in the wire harness • VTM-4 control unit is defective	(see page 15-32) (see page 15-34)

* : DTCs are indicated by the VTM-4 indicator when the data link connector (DLC) is connected to the HDS.



Symptom Troubleshooting Index

Symptom	Diagnostic Procedure	Also check for
The VTM-4 indicator comes on, but no DTCs are stored in any system: VTM-4, VSA, or PCM	Symptom troubleshooting (see page 15-41).	
The VTM-4 indicator does not come on	Symptom troubleshooting (see page 15-42).	
The VTM-4 LOCK indicator does not come on when the VTM-4 LOCK switch is pressed	Symptom troubleshooting (see page 15-43).	
The VTM-4 LOCK indicator comes on when the ignition switch is turned ON (II) and does not go off	Symptom troubleshooting (see page 15-45).	
The VTM-4 LOCK indicator does not come on for about 4 seconds when the ignition switch is turned ON (II)	Symptom troubleshooting (see page 15-46).	
Noise and judder when turning at full lock	1. Drain and refill the rear differential with new VTM-4 fluid (see page 15-47). 2. Do the Differential Function Test (see page 15-48). 3. Repeat steps 1 and 2. 4. Drain the rear differential, then install new drain plug washers, and refill with new VTM-4 fluid (see page 15-47).	
Clunk noise and then a bump when backing and turning	Normal clutch engagement at throttle opening	

Rear Differential

System Description

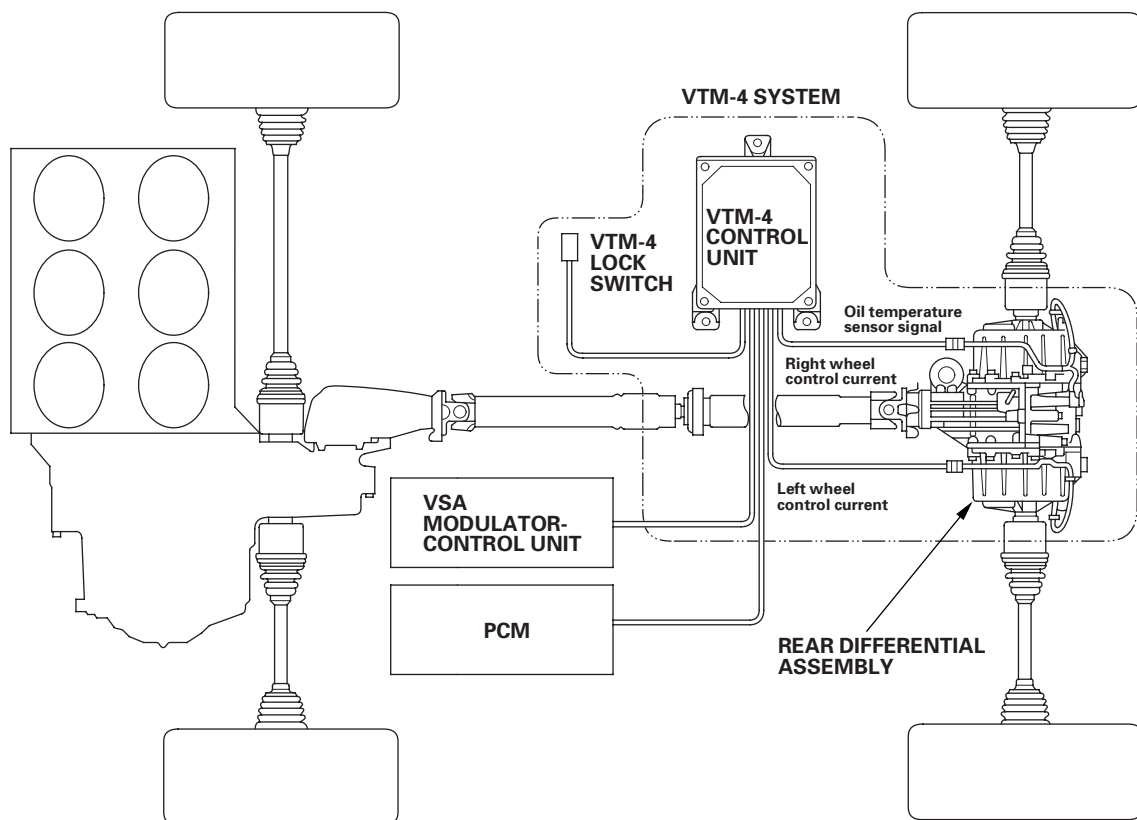
This vehicle is equipped with a rear differential system called the variable torque management 4WD (VTM-4) system. The VTM-4 control unit controls the current flowing through electromagnetic coils to engage and disengage the right and left clutches in the rear differential assembly.

The operation of the VTM-4 system consists of the following functions:

- Vehicle acceleration torque control (VATC)
- Limited slip differential (LSD)
- Lock control

These functions automatically combine to distribute driving torque between the front and rear wheels when the vehicle is being accelerated or when wheels are slipping. When the vehicle speed is about 18 mph (30 km/h) or below, and the transmission is in R, 2, or 1, the system will manually engage the rear differential clutches when the VTM-4 LOCK switch is pressed. By design, in lock mode, the torque is reduced gradually at speeds above 6 mph (10 km/h) to minimize the load on the 4WD system.

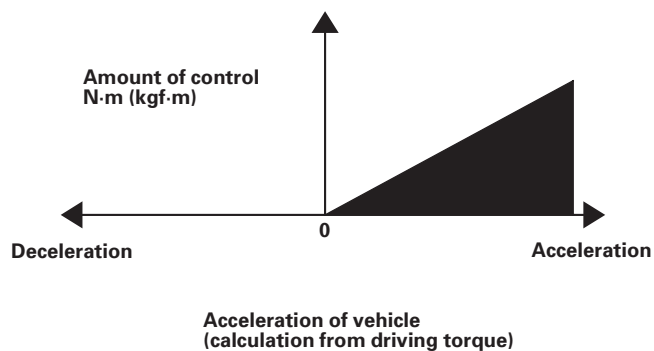
The VTM-4 control unit has a fail-safe function, a self-diagnosis function, and a provision to communicate with the HDS.





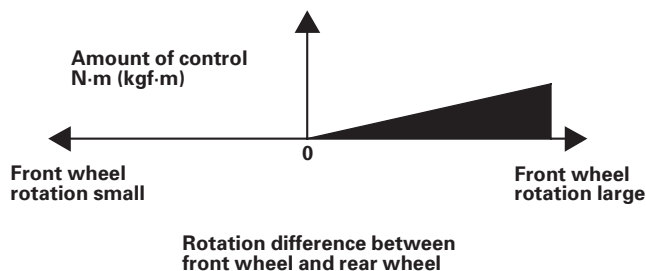
- VATC Control

The torque to be delivered to the rear wheels is calculated based on the acceleration of the vehicle calculated in the VTM-4 control unit.



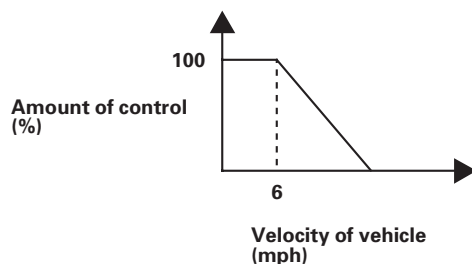
- LSD Control

The torque to be delivered to the rear wheels is calculated based on the differences in speed and acceleration between the front and rear wheels.



- LOCK Control

Rear differential clutch lock control is done by pushing the VTM-4 LOCK switch manually when the shift lever is in R, 1, or 2.



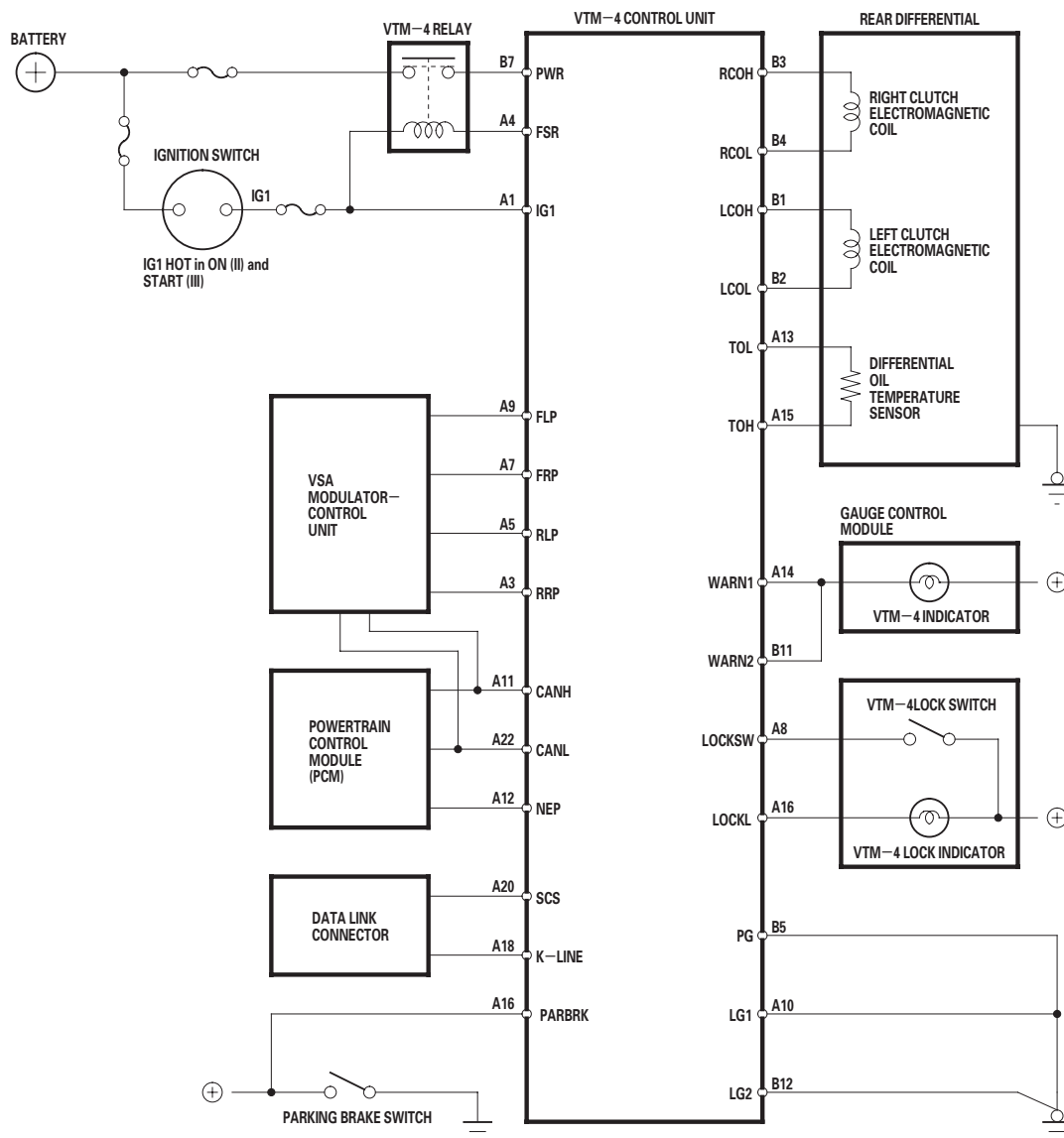
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Rear Differential

System Description (cont'd)

Electronic Control System

VTM-4 Control Unit Electrical Connections





VTM-4 Control Unit Inputs and Outputs

The VTM-4 control unit terminal voltage and measuring conditions for the 4WD control system are shown.

NOTE: Measure voltage with the connectors connected.

VTM-4 Control Unit Connector Terminal Locations

B (12P)						A (22P)															
1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement	
				Conditions	Voltage
A1	YEL	IG1 (Ignition 1)	Power supply for activating the system	Ignition switch ON (II)	Battery voltage
A3	GRY/RED	RRP (Rear right pulse)	Detect right-rear wheel sensor signal	Turn wheel at 1 rotation/second	There should be 0—about 5 V repeatedly. (A digital voltmeter reads about 2.5 V when the wheel is turning faster.)
A4	ORN/GRN	FSR (Fail-safe relay)	Drives VTM-4 relay	Ignition switch ON (II)	Battery voltage
				Engine running	Less than 1 V
A5	GRY/YEL	RLP (Rear left pulse)	Detects left-rear wheel sensor signal	Turn wheel at 1 rotation/second	There should be 0—about 5 V repeatedly. (A digital voltmeter reads about 2.5 V when the wheel is turning faster.)
A6	GRN/ORN	PARBRK (Parking brake)	Detects parking brake signal	Parking brake on	Less than 2 V
				Parking brake off	Battery voltage
A7	LT GRN	FRP (Front right pulse)	Detects right-front wheel sensor signal	Turn wheel at 1 rotation/second	There should be 0—about 5 V repeatedly. (A digital voltmeter reads about 2.5 V when the wheel is turning faster.)
A8	BRN/WHT	LOCKSW (LOCK switch)	Detects VTM-4 LOCK switch signal	Ignition switch ON (II)	Less than 1 V
				VTM-4 LOCK mode	Battery voltage
A9	WHT/RED	FLP (Front left pulse)	Detects left-front wheel sensor signal	Turn wheel at 1 rotation/second	There should be 0—about 5 V repeatedly. (A digital voltmeter reads about 2.5 V when the wheel is turning faster.)

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Rear Differential

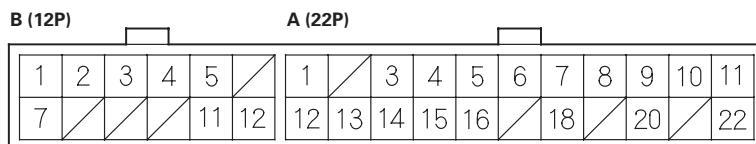
System Description (cont'd)

VTM-4 Control Unit Inputs and Outputs

The VTM-4 control unit terminal voltage and measuring conditions for the 4WD control system are shown.

NOTE: Measure voltage with the connectors connected.

VTM-4 Control Unit Connector Terminal Locations



Wire side of female terminals

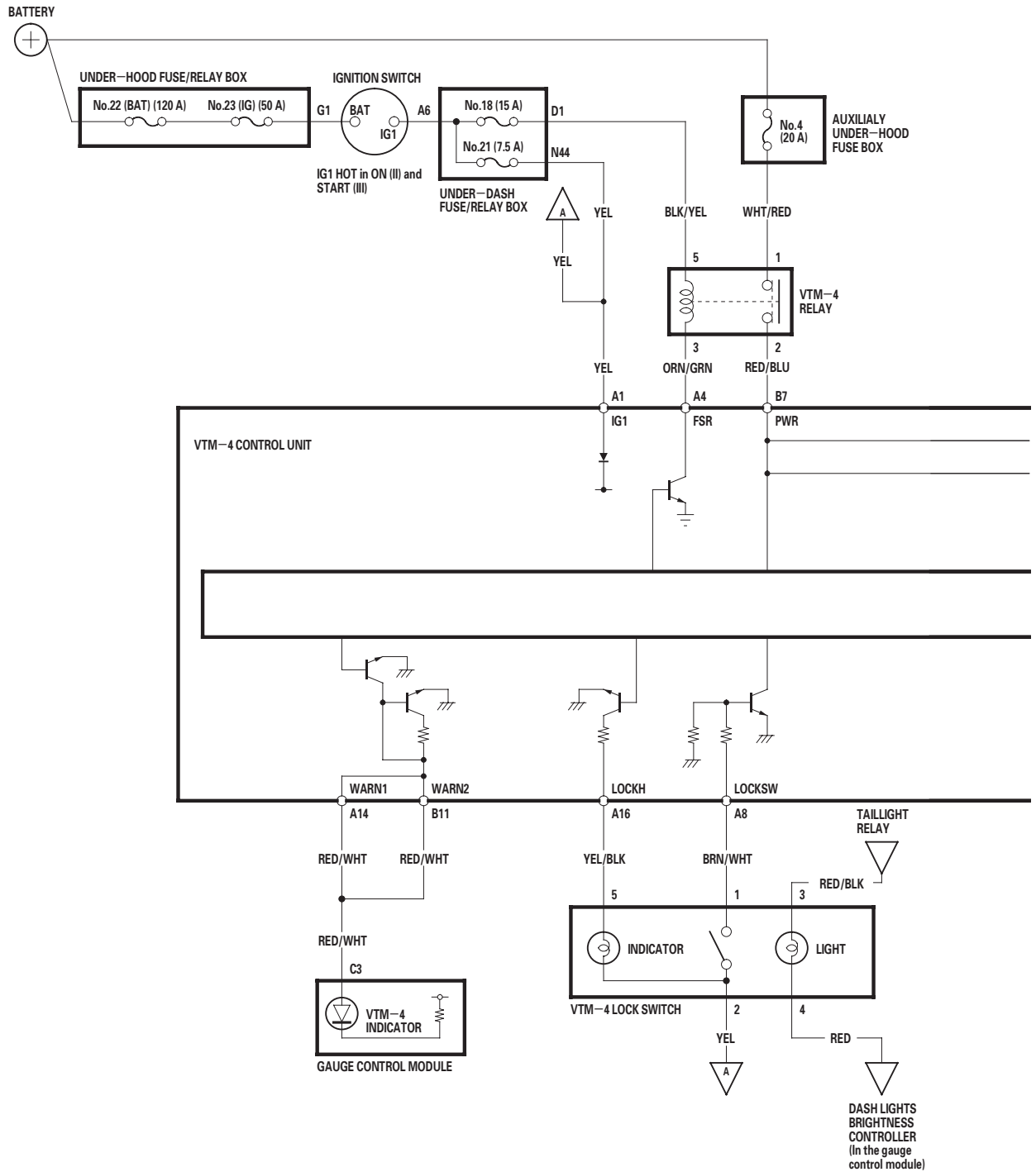
Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement	
				Conditions	Voltage
A10	BLK	LG1 (Logic ground)	Ground		Less than 0.5 V
A11	WHT	CANH (CAN communication signal high)	CAN communication signal	Ignition switch ON (II)	About 2.5 V (pulses)
A12	BLU	NEP (Engine revolution)	Detects engine revolution signal	Ignition switch ON (II)	Above 8 V
				Engine running at 1,000 rpm	5—8 V
A13	BLK	TOL (Temperature oil low)	Detects differential oil temperature sensor signal	Check at normal temperature with the ignition switch ON (II)	1—3.6 V
A14	RED/WHT	WARN1 (Warning 1)	Drives VTM-4 indicator	VTM-4 indicator on	Less than 4 V
				VTM-4 indicator off	Battery voltage
A15	WHT	TOH (Temperature oil high)	Power supply for differential oil temperature sensor	Check at normal temperature with the ignition switch ON (II)	4—5 V
A16	YEL/BLK	LOCKL (Lock lamp)	Drives VTM-4 LOCK indicator	VTM-4 LOCK indicator on	Less than 4 V
				VTM-4 LOCK indicator off	Battery voltage
A18	LT BLU	K-LINE	Communication signal to HDS	Ignition switch ON (II) (Not connected to HDS)	About 9.0 V
A20	BRN	SCS (Service check signal)	Detects service check connector signal	SCS circuit shorted	Less than 2 V
				SCS circuit opened	About 5 V
A22	RED	CANL (CAN communication signal low)	CAN communication signal	Ignition switch ON (II)	About 2.5 V (pulses)

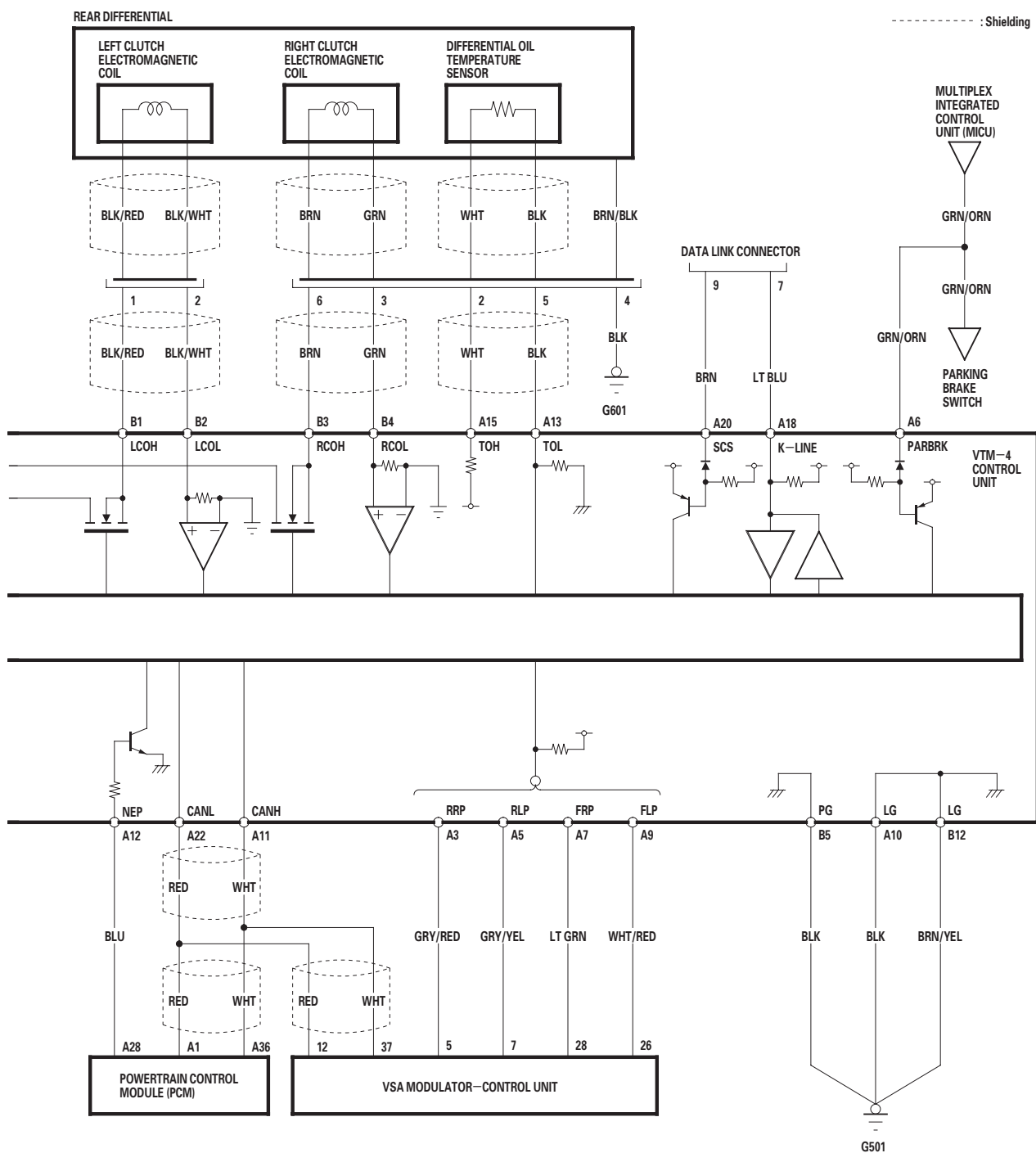


Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement	
				Conditions	Voltage
B1	BLK/RED	LCOH (Left coil high)	Drives left clutch electromagnetic coil (positive)	Ignition switch ON (II)	Less than 1 V
				Engine running	Less than 1 V
				VTM-4 LOCK mode	Above 3 V
B2	BLK/WHT	LCOL (Left coil low)	Drives left clutch electromagnetic coil (negative)	Ignition switch ON (II)	Less than 1 V
				Engine running	Less than 1 V
				VTM-4 LOCK mode	Less than 1 V
B3	BRN	RCOH (Right coil high)	Drives right clutch electromagnetic coil (positive)	Ignition switch ON (II)	Less than 1 V
				Engine running	Less than 1 V
				VTM-4 LOCK mode	Above 3 V
B4	GRN	RCOL (Right coil low)	Drives right clutch electromagnetic coil (negative)	Ignition switch ON (II)	Less than 1 V
				Engine running	Less than 1 V
				VTM-4 LOCK mode	Less than 1 V
B5	BLK	PG (Power ground)	Ground		Less than 0.5 V
B7	RED/BLU	PWR (Power)	Power supply for VTM-4 control unit	10 seconds after ignition switch ON (II)	Less than 3 V
				Engine running	Battery voltage
				VTM-4 LOCK mode	Battery voltage
B11	RED/WHT	WARN2 (Warning 2)	Drives VTM-4 indicator	VTM-4 indicator on	Less than 4 V
				VTM-4 indicator off	Battery voltage
B12	BLK	LG2 (Logic ground)	Ground		Less than 0.5 V

Rear Differential

Circuit Diagram





Rear Differential

DTC Troubleshooting

DTC 21-1, 21-2, 22-1, 22-2: Front Wheel Sensors

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 21-1, 21-2, and/or 21-2 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Check for DTCs in the VSA system with the HDS.

Are there any VSA DTCs indicated?

YES—Go to the indicated DTCs troubleshooting. ■

NO—Go to step 5.

5. Turn the ignition switch OFF.
6. Raise the vehicle, and make sure it is securely supported.
7. Spin the rear wheels by hand, and check for rear brake drag.

Are the rear brakes dragging?

YES—Repair cause of rear brake drag, and retest. ■

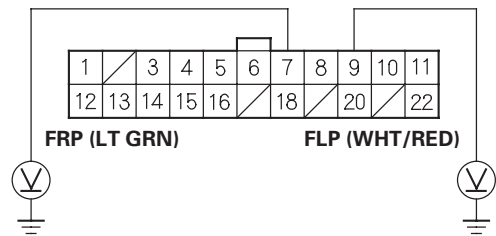
NO—Go to step 8.

8. Turn the ignition switch ON (II).

9. Measure voltage between the No. 7 and No. 9 terminals of the VTM-4 control unit connector A (22P) and body ground while rotating the appropriate wheel (1 rotation/second).

DTC	Appropriate Terminal
21 (Left-front)	A9
22 (Right-front)	A7

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there about 2 V to 3 V?

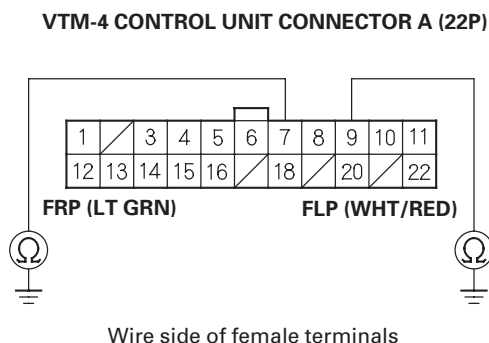
YES—Go to step 16.

NO—Go to step 10.

10. Turn the ignition switch OFF.
11. Disconnect the VTM-4 control unit connector A (22P) and the VSA modulator-control unit 46P connector.



12. Check for continuity between the terminals No. 7 and No. 9 of VTM-4 control unit connector A (22P) and body ground.

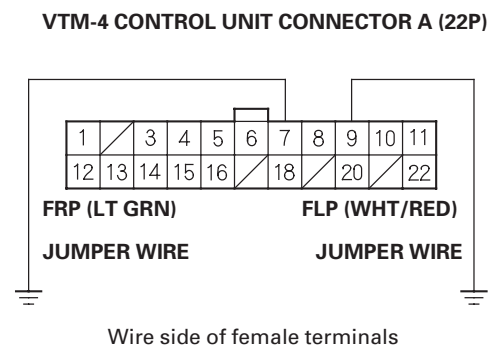


Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A7 and/or A9) and the VSA modulator-control unit. ■

NO—Go to step 13.

13. Connect the terminals No. 7 and No. 9 of VTM-4 control unit connector A (22P) to body ground with the jumper wires.

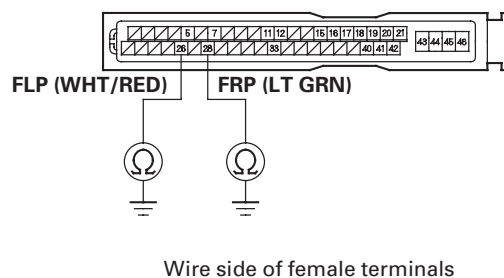


14. Disconnect the VSA modulator-control unit 46P connector.

15. Check for continuity between the VSA modulator-control unit 46P connector terminals and body ground.

Appropriate wheel	Appropriate Terminal VSA modulator-control unit
Right-front	28
Left-front	26

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Is there continuity?

YES—Go to step 16.

NO—Repair open in the wire between the VTM-4 control unit (A7 and/or A9) and the VSA modulator-control unit. ■

16. Check for poor connections or loose terminals at the VTM-4 control unit and the VSA modulator-control unit connectors. If the connections are OK, replace the VTM-4 control unit, then go to step 17.
17. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTCs 21-1, 21-2, and/or 22-2 indicated?

YES—Replace the VSA modulator-control unit (see page 19-94). ■

NO—The system is OK at this time. ■

Rear Differential

DTC Troubleshooting (cont'd)

DTC 23-1, 23-2, 24-1, 24-2: Rear Wheel Sensors

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Start the engine, shift the transmission into D. Test-drive the vehicle at speeds over 25 mph (40 km/h), while keeping the engine speed below 2,500 rpm for at least 30 seconds.

NOTE: Be careful not to overheat the rear differential clutch system.

4. Check for DTSs with the HDS.

Is DTCs 23-1, 23-2, 24-1, and/or 24-2 indicated?

YES—Go to step 5.

NO—Intermittent failure, the system is OK at this time. ■

5. Check for DTCs in the VSA system with the HDS.

Are there any VSA DTCs indicated?

YES—Go to the indicated DTCs troubleshooting. ■

NO—Go to step 6.

6. Turn the ignition switch OFF.
7. Raise the vehicle, and make sure it is securely supported.
8. Spin the rear wheels by hand, and check for rear brake drag.

Are the rear brakes dragging?

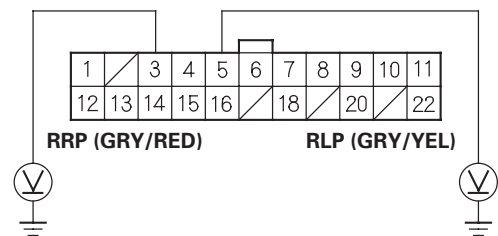
YES—Repair cause of rear brake drag, and retest. ■

NO—Go to step 9.
9. Turn the ignition switch ON (II).

10. Measure voltage between the No. 3 and No. 5 terminals of the VTM-4 control unit connector A (22P) and body ground while rotating the appropriate wheel (1 rotation/second).

DTC	Appropriate Terminal
23 (Left-rear)	A5
24 (Right-rear)	A3

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there about 2 V to 3 V?

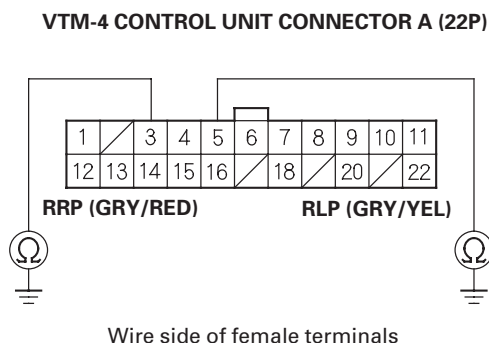
YES—Go to step 18.

NO—Go to step 11.

11. Turn the ignition switch OFF.
12. Disconnect the VTM-4 control unit connector A (22P) and the VSA modulator-control unit 46P connector.



13. Check for continuity between the same terminal of VTM-4 control unit connector A (22P) and body ground.

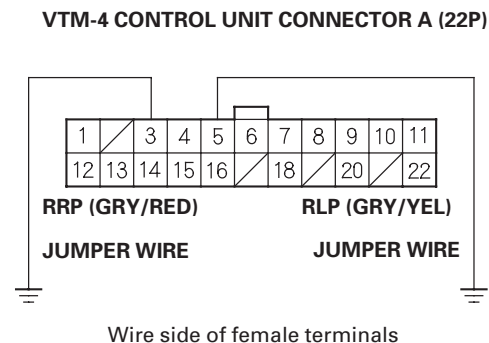


Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A3 and/or A5) and the VSA modulator-control unit. ■

NO—Go to step 14.

14. Connect the terminals No. 3 and No. 5 of VTM-4 control unit connector A (22P) to body ground with the jumper wires.

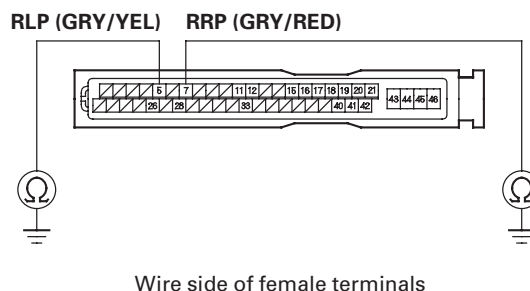


15. Disconnect the VSA modulator-control unit 46P connector.

16. Check for continuity between the VSA modulator-control unit 46P connector terminals and body ground.

Appropriate wheel	Appropriate Terminal VSA modulator-control unit
Right-rear	5
Left-rear	7

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Is there continuity?

YES—Go to step 17.

NO—Repair open in the wire between the VTM-4 control unit (A3 and/or A5) and the VSA modulator-control unit.

17. Check for poor connection or loose terminals at the VTM-4 control unit and the VSA modulator-control unit connectors. If the connections are OK, replace the VTM-4 control unit, then go to step 18.
18. Start the engine, shift the transmission into D. Test-drive the vehicle at speeds over 25 mph (40 km/h), while keeping the engine speed below 2,500 rpm for at least 30 seconds.

NOTE: Be careful not to overheat the rear differential clutch system.

19. Check for DTCs with the HDS.

Is DTCs 23-1, 23-2, 24-1, and/or 24-2 indicated?

YES—Replace the VSA modulator-control unit (see page 19-94). ■

NO—The system is OK at this time. ■

Rear Differential

DTC Troubleshooting (cont'd)

DTC 26-1: VSA Modulator-Control Unit or Wire Harness

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 26-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time.■

4. Check for DTCs in the VSA system with the HDS.

Are there any VSA DTCs indicated?

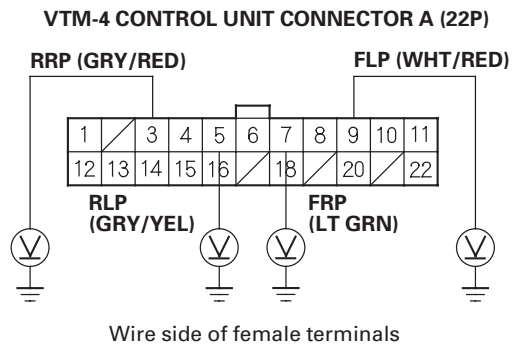
YES—Go to the indicated DTCs troubleshooting.■

NO—Go to step 5.

5. Turn the ignition switch OFF.
6. Raise the vehicle, and make sure it is securely supported.
7. Turn the ignition switch ON (II).

8. Measure voltage between the No. 3, No. 5, No. 7, and No. 9 terminals of the VTM-4 control unit connector A (22P) and body ground while rotating the appropriate wheel one rotation a second.

Appropriate wheel	Appropriate Terminal
Left-front	A9
Right-front	A7
Left-rear	A5
Right-rear	A3



Are all four readings about 2 V to 3 V?

YES—Check for poor connections or loose terminals at the VTM-4 control unit. If the connections are OK, replace the VTM-4 control unit (see page 15-50).■

NO—Check for poor connections or loose terminals between the VTM-4 control unit and the VSA modulator-control unit. If the connections are OK, replace the VSA modulator-control unit (see page 19-94).■



DTC 37-1, 38-1: Engine RPM Signal Circuit

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTSs with the HDS.

Is DTCs 37-1 and/or 38-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Check for DTC's in the PGM-FI DTCs indicated

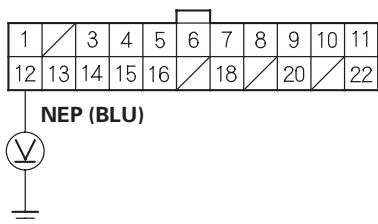
Are there any PGM-FI DTCs indicated?

YES—Go to the indicated DTCs troubleshooting. ■

NO—Go to step 5.

5. Turn the ignition switch OFF.
6. Disconnect VTM-4 control unit connector A (22P).
7. Turn the ignition switch ON (II).
8. Measure voltage between the No. 12 terminal of the VTM-4 control unit connector A (22P) and body ground with the engine running.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Condition	Voltage
Ignition switch ON (II)	Above 8 V
Engine speed at 1,000 rpm	5—8 V

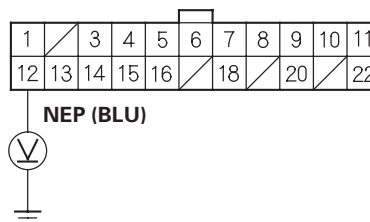
Is the voltage correct?

YES—Go to step 18.

NO—Go to step 9.

9. Turn the ignition switch OFF.
10. Jump the SCS line with the HDS.
11. Disconnect PCM connector A (44P).
12. Turn the ignition switch ON (II).
13. Measure voltage between the No. 12 terminal of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there voltage?

YES—Repair short to power in the wire between the VTM-4 control unit (A12) and the PCM (A28). ■

NO—Go to step 14.

14. Turn the ignition switch OFF.

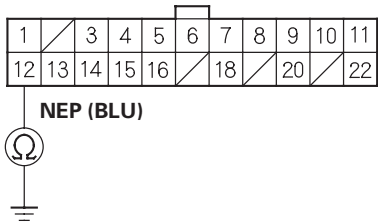
(cont'd)

Rear Differential

DTC Troubleshooting (cont'd)

15. Check for continuity between the No. 12 terminal of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

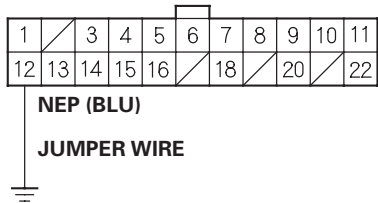
Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A12), and the PCM (A28). ■

NO—Go to step 16.

16. Connect the No. 12 terminal of the VTM-4 control unit connector A (22P) to body ground with a jumper wire.

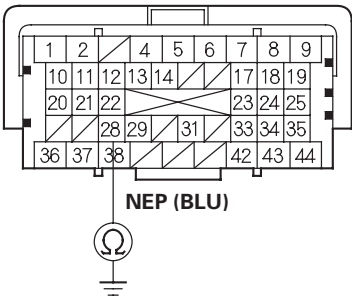
VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

17. Check for continuity between the No. 28 terminal of the PCM connector A (44P) and body ground.

PCM CONNECTOR A (44P)



Wire side of female terminals

Is there continuity?

YES—Go to step 18.

NO—Repair open in the wire between the VTM-4 control unit (A12), and the PCM (A28). ■

18. Check for poor connections or loose terminals at the VTM-4 control unit, and the PCM connectors. If the connections are OK, replace the VTM-4 control unit, then go to step 19.
19. Test-drive the vehicle, and watch the VTM-4 indicator.

Is DTCs 37-1 and/or 38-1 indicated?

YES—Replace the PCM (see page 11-205). ■

NO—The system is OK at this time. ■



DTC 41-1, 41-2: CAN Communication (PCM/VSA System)

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTCs 41-1 and/or 41-2 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Check for a PCM/VSA system DTCs.

Is there a DTCs?

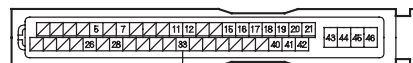
YES—Troubleshoot the indicated PCM/VSA DTCs. ■

NO—Go to step 6.

5. Disconnect the VTM-4 control unit connector A (44P), and VSA modulator-control unit 46P connector.
6. Turn the ignition switch OFF.
7. Jump the SCS line with the HDS.
8. Disconnect the PCM connector A (44P).

9. Check for continuity between the VTM-4 control unit connector A (22P) terminal No. 11 and PCM connector A (44P) terminal No. 44, and between the VTM-4 control unit connector A (22P) terminal No. 11 and VSA modulator-control unit 46P connector terminal No. 33.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR

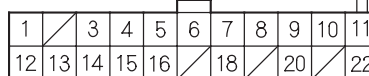


CANH (WHT) Wire side of female terminals



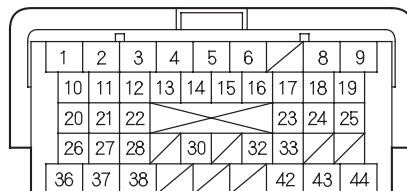
CANH (WHT) CANH (WHT)

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

PCM CONNECTOR A (44P)



CANH (WHT)

Wire side of female terminals

Is there continuity?

YES—Go to step 10.

NO—Repair open in the wire between the VTM-4 control unit (A11) and the PCM (A44), the VSA modulator-control unit. ■

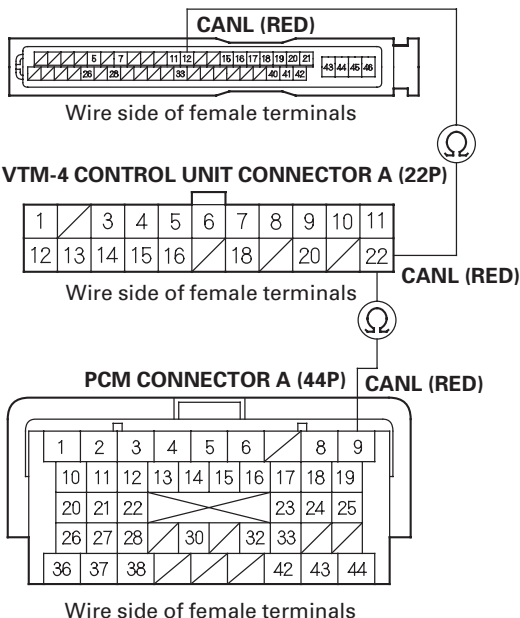
(cont'd)

Rear Differential

DTC Troubleshooting (cont'd)

10. Check for continuity between the VTM-4 control unit connector A (22P) terminal No. 22 and PCM connector A (44P) terminal No. 9, and between the VTM-4 control unit connector A (22P) terminal No. 22 and VSA modulator-control unit 46P connector terminal No. 12.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Is there continuity?

YES—Check for poor connections or loose terminals at the VTM-4 control unit, PCM, VSA modulator-control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

NO—Repair open in the wire between the VTM-4 control unit (A22) and the PCM (A9), the VSA modulator-control unit. ■



DTC 42-1, 42-2, 43-1: Differential Oil Temperature Sensor

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

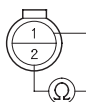
1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with in the HDS.

Is DTCs 42-1, 42-2, and/or 43-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■
4. Turn the ignition switch OFF.
5. Remove the wire harness cover from the rear differential (see page 15-49).
6. Disconnect the 2P connector from the differential oil temperature sensor, then measure resistance between the No. 1 and No. 2 terminals of the differential oil temperature sensor.

DIFFERENTIAL OIL TEMPERATURE SENSOR 2P CONNECTOR



Terminal side of male terminals

Oil temperature	Resistance
32 °F (0 °C)	5.82 k to 7.26 k Ω
86 °F (30 °C)	1.53 k to 1.83 k Ω
212 °F (100 °C)	148 to 162 Ω
284 °F (140 °C)	52 to 61 Ω

Is the resistance correct?

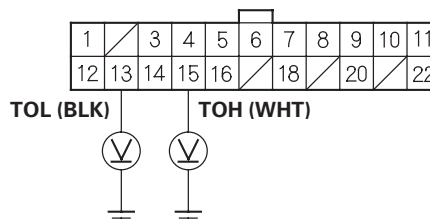
YES—Go to step 7.

NO—Replace the differential oil temperature sensor (see page 15-49). ■

7. Disconnect VTM-4 control unit connector A (22P).
8. Turn the ignition switch ON (II).

9. Measure voltage between the No. 13 and No. 15 terminals of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

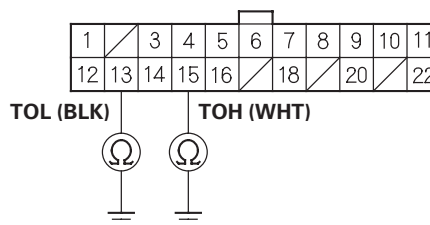
Is there voltage?

YES—Repair short to power in the wire between the VTM-4 control unit (A13 or A15) and the differential oil temperature sensor. ■

NO—Go to step 10.

10. Turn the ignition switch OFF.
11. Check for continuity between the No. 13 and No. 15 terminals of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A13 or A15) and the differential oil temperature sensor. ■

NO—Go to step 12.

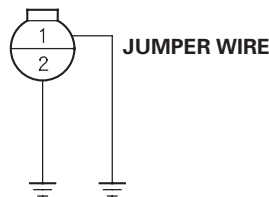
(cont'd)

Rear Differential

DTC Troubleshooting (cont'd)

12. Connect the differential oil temperature sensor 2P connector terminals to body ground with jumper wires.

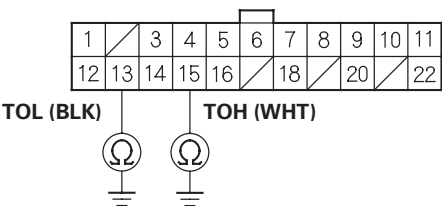
DIFFERENTIAL OIL TEMPERATURE
SENSOR 2P CONNECTOR



Terminal side of female terminals

13. Check for continuity between the No. 13 and No. 15 terminals of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there continuity?

YES—Check for poor connections or loose terminals at the VTM-4 control unit and the differential oil temperature sensor connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

NO—Repair open in the wire between the VTM-4 control unit (A13 or A15) and the differential oil temperature sensor. ■

DTC 44-1: VTM-4 Relay

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

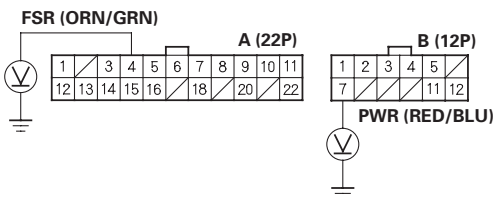
Is DTC 44-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Measure voltage between the No. 4 terminal of the VTM-4 control unit connector A (22P) and body ground, and between the No. 7 terminal of the VTM-4 control unit connector B (12P) and body ground with the ignition switch ON (II), and with the engine started.

VTM-4 CONTROL UNIT CONNECTORS



Wire side of female terminals

Condition	B7 (PWR)	A4 (FSR)
Ignition switch ON (II)	Less than 3 V	Battery voltage
Engine start	Battery voltage	Less than 1 V

Is the voltage correct?

YES—Go to step 16.

NO—Go to step 5.

5. Turn the ignition switch OFF.



6. Remove the VTM-4 relay, and test it (see page 22-75).

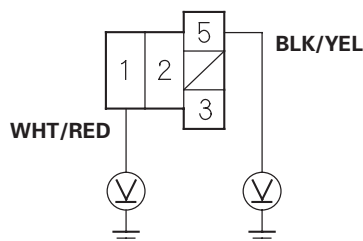
Is the VTM-4 relay OK?

YES—Go to step 7.

NO—Replace the VTM-4 relay (see page 15-50). ■

7. Turn the ignition switch ON (II) with the VTM-4 relay removed.
8. Measure voltage between the No. 1 and No. 5 terminals of the VTM-4 relay 5P connector and body ground.

VTM-4 RELAY 5P CONNECTOR



Terminal side of female terminals

Is there battery voltage?

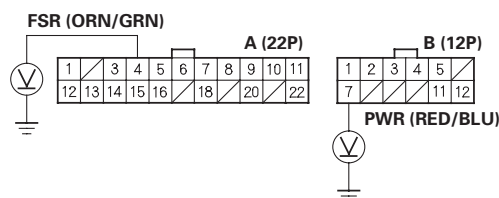
YES—Go to step 9.

NO—Check for blown No. 4 (20 A) fuse in the auxiliary fuse box or No. 18 (15 A) fuse in the driver's under-dash fuse/relay box. If the fuses are OK, repair open in the wire between the auxiliary fuse box or the driver's under-dash fuse/relay box and the VTM-4 relay. ■

9. Turn the ignition switch OFF.
10. Disconnect the VTM-4 control unit connector A (22P) and connector B (12P).
11. Turn the ignition switch ON (II).

12. Measure voltage between the No. 4 terminal of the VTM-4 control unit connector A (22P) and body ground, and between the No. 7 terminal of the VTM-4 control unit connector B (12P) and body ground.

VTM-4 CONTROL UNIT CONNECTORS



Wire side of female terminals

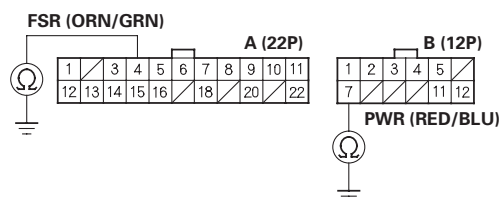
Is there battery voltage?

YES—Repair short to power in the wire between the VTM-4 control unit (A4 or B7) and the VTM-4 relay. ■

NO—Go to step 12.

13. Turn the ignition switch OFF.
14. Check for continuity between the No. 4 terminal of the VTM-4 control unit connector A (22P) and body ground, and between the No. 7 terminal of the VTM-4 control unit connector B (12P) and body ground.

VTM-4 CONTROL UNIT CONNECTORS



Wire side of female terminals

Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A4 or B7) and the VTM-4 relay. ■

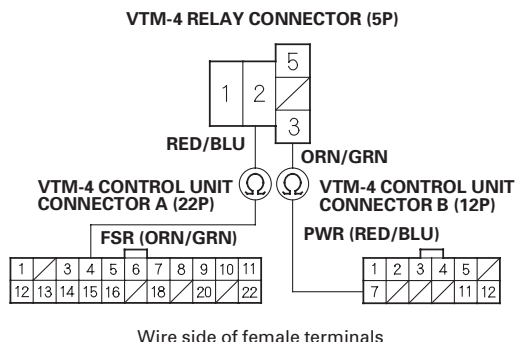
NO—Go to step 15.

(cont'd)

Rear Differential

DTC Troubleshooting (cont'd)

15. Check for continuity between the No. 4 terminal of the VTM-4 control unit connector A (22P) and the No. 3 terminal of the VTM-4 relay, and between the No. 7 terminal of the VTM-4 control unit connector B (12P) and the No. 2 terminal of the VTM-4 relay.



Is there continuity?

YES—Go to step 16.

NO—Repair open in the wire between the A4 or B7 terminals of the VTM-4 control unit and the VTM-4 relay. ■

16. Check for poor connections or loose terminals at the VTM-4 control unit and the VTM-4 relay connectors. If the connections are OK, go to step 17.
17. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 44-1 indicated?

YES—Replace the VTM-4 control unit (see page 15-50). ■

NO—The system is OK at this time. ■

DTC 51-1, 52-1, 53-1, 53-2, 54-1: Left Clutch Electromagnetic Coil

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

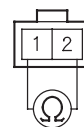
Is DTCs 51-1, 52-1, 53-2, and/or 54-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Turn the ignition switch OFF.
5. Disconnect the left clutch electromagnetic coil 2P connector on the differential.
6. Measure resistance between the No. 1 and No. 2 terminals of the left clutch electromagnetic coil 2P connector.

LEFT CLUTCH ELECTROMAGNETIC COIL 2P CONNECTOR



Terminal side of male terminals

Is there 1 to 3 Ω ?

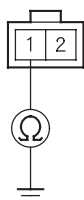
YES—Go to step 7.

NO—Replace the rear differential assembly. ■



7. Measure resistance between the No. 1 terminal of the left clutch electromagnetic coil and differential carrier assembly.

**LEFT CLUTCH ELECTROMAGNETIC COIL
2P CONNECTOR**



Terminal side of male terminals

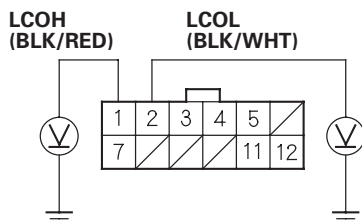
Is there about 50 M Ω or more?

YES—Go to step 8.

NO—Replace the rear differential assembly. ■

8. Disconnect the VTM-4 control unit connector B (12P).
9. Turn the ignition switch ON (II).
10. Measure voltage between the No. 1 and No. 2 terminals of the VTM-4 control unit connector B (12P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR B (12P)



Wire side of female terminals

Is there battery voltage?

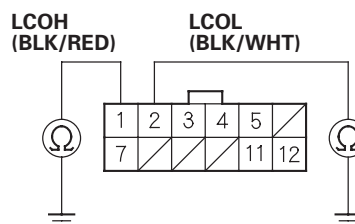
YES—Repair short to power in the wire between the VTM-4 control unit (B1 or B2) and the left clutch electromagnetic coil. ■

NO—Go to step 11.

11. Turn the ignition switch OFF.

12. Check for continuity between the No. 1 and No. 2 terminals of the VTM-4 control unit connector B (12P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR B (12P)



Wire side of female terminals

Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (B1 or B2) and the left clutch electromagnetic coil. ■

NO—Go to step 13.

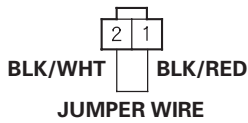
(cont'd)

Rear Differential

DTC Troubleshooting (cont'd)

13. Connect a jumper wire between the No. 1 and No. 2 terminals of the left clutch electromagnetic coil 2P connector.

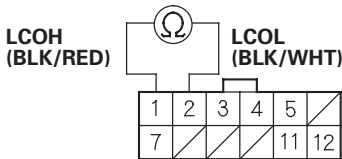
LEFT CLUTCH ELECTROMAGNETIC COIL
2P CONNECTOR



Wire side of female terminals

14. Check for continuity between the No. 1 and No. 2 terminals of the VTM-4 control unit connector B (12P).

VTM-4 CONTROL UNIT CONNECTOR B (12P)



Wire side of female terminals

Is there continuity?

YES—Do the Rear Differential Function Test (see page 15-48). If the rear differential is normal, replace the VTM-4 control unit (see page 15-50). ■

NO—Repair open in the wire between the VTM-4 control unit (B1 or B2) and the left clutch electromagnetic coil. ■

DTC 53-2, 55-1, 56-1, 57-1, 58-1: Right Clutch Electromagnetic Coil

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

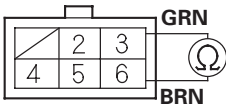
Is DTCs 53-2, 55-1, 56-1, 57-1, and/or 58-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Turn the ignition switch OFF.
5. Disconnect the right clutch electromagnetic coil/differential oil temperature sensor 6P connector on the differential.
6. Measure resistance between the No. 3 and No. 6 terminals of the right clutch electromagnetic coil/differential oil temperature sensor 6P connector.

RIGHT CLUTCH ELECTROMAGNETIC COIL/
DIFFERENTIAL OIL TEMPERATURE SENSOR
6P CONNECTOR



Terminal side of male terminals

Is there 1 to 3 Ω ?

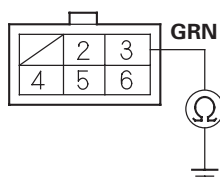
YES—Go to step 7.

NO—Replace the rear differential assembly.



7. Measure resistance between the No. 3 terminal of the right clutch electromagnetic coil/differential oil temperature sensor 6P connector and the differential carrier assembly.

**RIGHT CLUTCH ELECTROMAGNETIC COIL/
DIFFERENTIAL OIL TEMPERATURE SENSOR
6P CONNECTOR**



Terminal side of male terminals

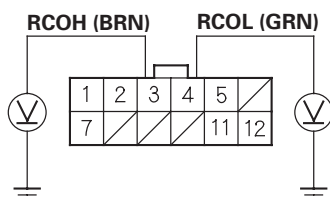
Is there 50 MΩ or more?

YES—Go to step 8.

NO—Replace the rear differential assembly. ■

8. Disconnect the VTM-4 control unit connector B (12P).
9. Turn the ignition switch ON (II).
10. Measure voltage between the No. 3 and No. 4 terminals of the VTM-4 control unit connector B (12P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR B (12P)



Wire side of female terminals

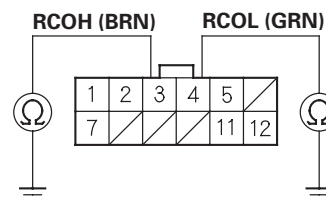
Is there battery voltage?

YES—Repair short to power in the wire between the VTM-4 control unit (B3 or B4) and the right clutch electromagnetic coil. ■

NO—Go to step 11.

11. Turn the ignition switch OFF.
12. Check for continuity between the No. 3 and No. 4 terminals of the VTM-4 control unit connector B (12P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR B (12P)



Wire side of female terminals

Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (B3 or B4) and the right clutch electromagnetic coil. ■

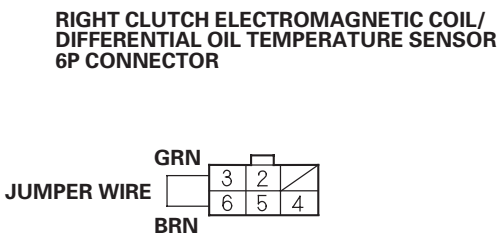
NO—Go to step 13.

(cont'd)

Rear Differential

DTC Troubleshooting (cont'd)

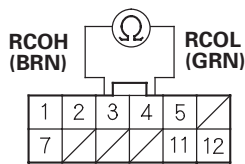
13. Connect a jumper between the No. 3 and No. 6 terminals of the right clutch electromagnetic coil/ differential oil temperature sensor 6P connector.



Wire side of female terminals

14. Check the for continuity between the No. 3 and No. 4 terminals of the VTM-4 control unit connector B (12P).

VTM-4 CONTROL UNIT CONNECTOR B (12P)



Wire side of female terminals

Is there continuity?

YES—Do the Rear Differential Function Test (see page 15-48). If the rear differential is normal, replace the VTM-4 control unit (see page 15-50). ■

NO—Repair open in the wire between the VTM-4 control unit (B3 or B4) and the right clutch electromagnetic coil. ■



DTC 59-1: Right/Left Clutch Electromagnetic Coil Power Supply

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 59-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Check the battery.

Is the specified battery installed, and is it fully charged?

YES—Go to step 5.

NO—Replace or charge the battery. ■

5. Watch the charging system indicator.

Does the charging system indicator come on with the ignition switch ON (II), and go off with the engine started?

YES—Check for poor connections or loose terminals at the VTM-4 control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

NO—Check the charging system. ■

DTC 73-1: MAP (Manifold Absolute Pressure) Sensor or PCM

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 73-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Check for DTCs in the PGM-FI system with the HDS.

Are there any PGM-FI DTCs indicated?

YES—Go to the indicated DTCs troubleshooting. ■

NO—Check for poor connections or loose terminals at the VTM-4 control unit and the PCM connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

Rear Differential

DTC Troubleshooting (cont'd)

DTC 76-1: Rear Differential Clutch Warning System

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Start the engine, shift the transmission into D. Test-drive the vehicle at speeds over 25 mph (40 km/h), while keeping the engine speed below 2,500 rpm for at least 30 seconds.

NOTE: Be careful not to overheat the rear differential clutch system.

4. Check for DTCs with the HDS.

Is DTC 76-1 indicated?

YES—Go to step 5.

NO—Intermittent failure, the system is OK at this time. ■

5. Check for DTCs in the VSA system with the HDS.

Are there any VSA DTCs indicated?

YES—Check the VSA system for DTCs (see page 19-39).

NO—Go to step 6.

6. Turn the ignition switch OFF.
7. Raise the vehicle, and make sure it is securely supported.
8. Spin the rear wheels by hand, and check for rear brake drag.

Are the rear brakes dragging?

YES—Repair cause of rear brake drag, and retest. ■

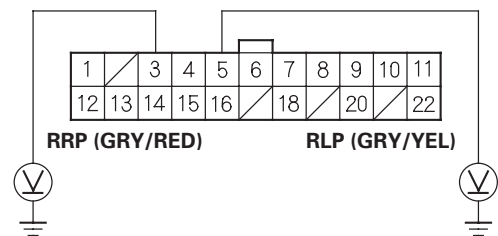
NO—Go to step 9.

9. Turn the ignition switch ON (II).

10. Measure voltage between the No. 3 and No. 5 terminals of the VTM-4 control unit connector A (22P) and body ground while rotating the appropriate wheel (1 rotation/second).

Appropriate wheel	Appropriate Terminal
Left-rear	A5
Right-rear	A3

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Is there about 2 to 3 V?

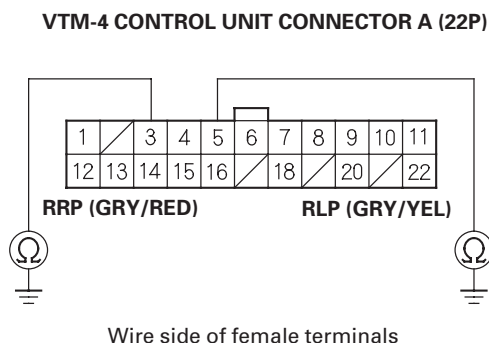
YES—Go to step 18.

NO—Go to step 11.

11. Turn the ignition switch OFF.
12. Disconnect the VTM-4 control unit and the VSA modulator-control unit connectors.



13. Check for continuity between the No. 3 and No. 5 terminals of VTM-4 control unit connector A (22P) and body ground.

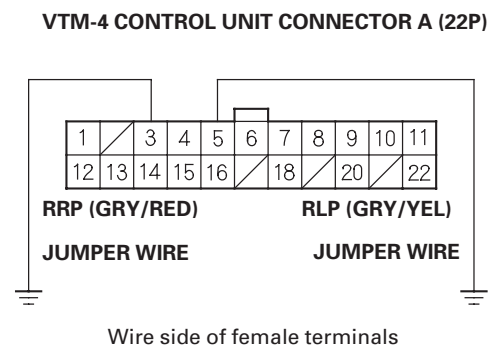


Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A3 and/or A5) and the VSA modulator-control unit. ■

NO—Go to step 14.

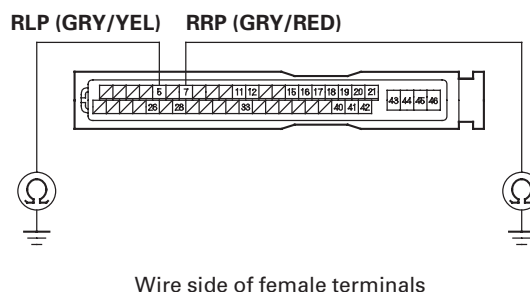
14. Connect the No. 3 and No. 5 terminals of VTM-4 control unit connector A (22P) to body ground with the jumper wires.



15. Check for continuity between the VSA modulator-control unit 46P connector terminals and body ground.

Appropriate wheel	Appropriate Terminal	
	VTM-4 control unit	VSA modulator-control unit
Right-rear	A3	5
Left-rear	A5	7

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Is there continuity?

YES—Go to step 16.

NO—Repair open in the wire between the VTM-4 control unit (A3 and/or A5) and the VSA modulator-control unit. ■

16. Check for poor connections or loose terminals at the VTM-4 control unit and the VSA modulator-control unit connectors. If the connections are OK, replace the VTM-4 control unit, then go to step 17.
17. Start the engine, shift the transmission into D. Test-drive the vehicle at speeds over 25 mph (40 km/h), while keeping the engine speed below 2,500 rpm for at least 30 seconds.

NOTE: Be careful not to overheat the rear differential clutch system.

18. Check for DTCs with the HDS.

Is DTC 76-1 indicated?

YES—Replace the VSA modulator-control unit (see page 19-94). ■

NO—The system is OK at this time. ■

Rear Differential

DTC Troubleshooting (cont'd)

DTC 77-1: PCM

NOTE:

- Before you troubleshoot, review the general troubleshooting information (see page 15-4).
- Check the fuel and emissions system DTCs. If there is a DTC, troubleshoot the indicated DTC first, then troubleshoot DTC 77.

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 77-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Update the PCM if it does not have the latest software (see page 11-7), or substitute a known-good PCM (see page 11-8).
5. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 77-1 indicated?

YES—Check for loose terminal fit in the VTM-4 control unit. If it is normal, replace the VTM-4 control unit (see page 15-50). ■

NO—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-205). ■

DTC 78-1: VTM-4 Control Unit

NOTE: Before you troubleshoot, review the general troubleshooting information (see page 15-4).

1. Turn the ignition switch ON (II).
2. Clear the DTC (see page 15-8).
3. Test-drive the vehicle, and check for DTCs with the HDS.

Is DTC 78-1 indicated?

YES—Go to step 4.

NO—Intermittent failure, the system is OK at this time. ■

4. Check the battery.

Is the specified battery installed, and is it fully charged?

YES—Go to step 5.

NO—Replace or charge the battery. ■

5. Watch the charging system indicator.

Does the charging system indicator come on with the ignition switch ON (II), and go off with the engine started?

YES—Go to step 6.

NO—Check the charging system. ■

6. Check for installation of any aftermarket CB or Ham radios which may cause an RF signal interference.

Is there an aftermarket radio installed?

YES—Disconnect the aftermarket radio, and retest. ■

NO—Check for poor connections or loose terminals at the VTM-4 control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■



Symptom Troubleshooting

The VTM-4 indicator comes on, but no DTCs are stored in any system: VTM-4, VSA, or PCM

1. Check the No. 21 (7.5 A) fuse in the driver's under-dash fuse/relay box.

Is the fuse OK?

YES—Go to step 2.

NO—Replace the fuse, and recheck. ■

2. Reinitialize the VTM-4 control unit, and watch the VTM-4 indicator (see page 15-5).

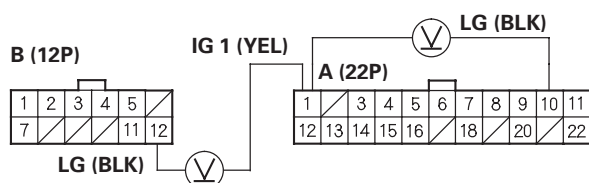
Does the VTM-4 indicator come on and stay on?

YES—Go to step 3.

NO—The system is OK at this time. ■

3. Turn the ignition switch ON (II).
4. Measure voltage between the No. 1 and No. 10 terminals of the VTM-4 control unit connector A (22P), and the No. 1 terminal of the VTM-4 control unit connector A (22P) and the No. 12 terminal of the VTM-4 control unit connector B (12P).

VTM-4 CONTROL UNIT CONNECTORS



Wire side of female terminals

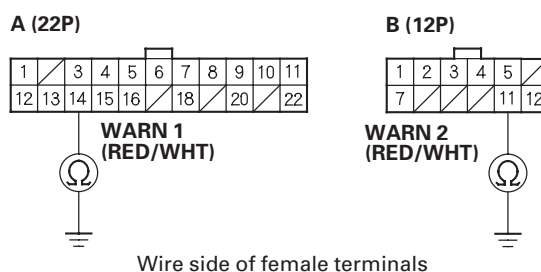
Is there battery voltage?

YES—Go to step 5.

NO—Repair open in the wire between the VTM-4 control unit (A1) and the driver's under-dash fuse/relay box, or repair open in the wire between the VTM-4 control unit (A10 or B12) and body ground, or check the poor ground (G501). ■

5. Turn the ignition switch OFF.
6. Disconnect the VTM-4 control unit and the gauge control module connectors.
7. Check for continuity between the No. 14 terminal of the VTM-4 control unit connector A (22P), and the No. 11 terminal of the VTM-4 control unit connector B (12P) to body ground.

VTM-4 CONTROL UNIT CONNECTORS



Wire side of female terminals

Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A14 or B11) and the gauge control module. ■

NO—Go to step 8.

8. Reconnect the gauge control module connectors.
9. Turn the ignition switch ON (II).
10. Watch the VTM-4 indicator.

Does the VTM-4 indicator come on?

YES—Replace the gauge control module (see page 22-263). ■

NO—Check for poor connections or loose terminals at the VTM-4 connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

Rear Differential

Symptom Troubleshooting (cont'd)

The VTM-4 indicator does not come on

1. Do the gauge control module self-diagnosis function (see page 22-244).

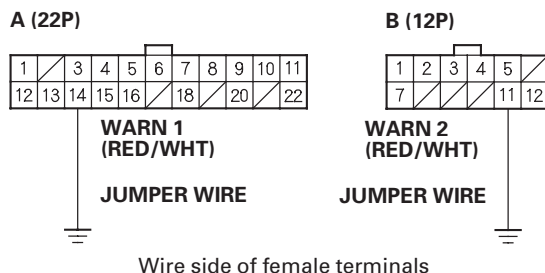
Is the gauge control module OK?

YES—Go to step 2.

NO—Go to the gauge control module input test (see page 22-244) and check for an open or short in the power and ground. ■

2. Disconnect the VTM-4 control unit connectors A (22P) and B (12P).
3. Connect the No. 14 terminal of the VTM-4 control unit connector A (22P) and No. 11 terminal of the VTM-4 control unit connector B (12P) to body ground with jumper wires.

VTM-4 CONTROL UNIT CONNECTORS



4. Turn the ignition switch ON (II).
5. Watch the VTM-4 indicator.

Does the VTM-4 indicator come on?

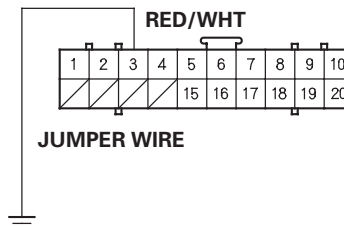
YES—Check for poor connections or loose terminals at the VTM-4 control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

NO—Go to step 6.

6. Turn the ignition switch OFF.
7. Disconnect gauge control module connector A (30P).

8. Connect the No. 3 terminal of the gauge control module connector C (20P) to body ground with a jumper wire.

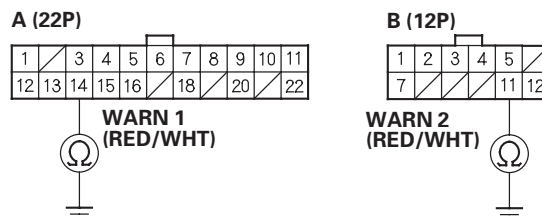
GAUGE CONTROL MODULE CONNECTOR C (20P)



Wire side of female terminals

9. Check for continuity between the No. 14 terminal of the VTM-4 control unit connector A (22P) and body ground, and the No. 11 terminal of the VTM-4 control unit connector B (12P) and body ground.

VTM-4 CONTROL UNIT CONNECTORS



Wire side of female terminals

Is there continuity?

YES—Substitute a known-good gauge control module and recheck. If the symptom/indication goes away with the known-good gauge control module, replace the original gauge control module (see page 22-263). ■

NO—Repair open in the wire between the gauge control module (C3) and the VTM-4 control unit. ■



The VTM-4 LOCK indicator does not come on when the VTM-4 LOCK switch is pressed

NOTE: The VTM-4 LOCK indicator will only come on when the engine is running and the transmission is in R, 1, or 2 before the VTM-4 LOCK switch is pressed.

1. Check the No. 21 (7.5 A) fuse in the driver's under-dash fuse/relay box.

Is the fuse OK?

YES—Go to step 2.

NO—Replace the fuse, and recheck. ■

2. Turn the ignition switch ON (II).
3. Watch the VTM-4 LOCK indicator.

Does the VTM-4 LOCK indicator come on, and does it go off about 4 seconds later?

YES—Go to step 4.

NO—Go to step 11.

4. Start the engine, and move the shift lever to R, 1, and 2, then watch the VTM-4 LOCK indicator.

Does the VTM-4 LOCK indicator come on when the VTM-4 LOCK switch is pressed?

YES—The system is OK at this time. ■

NO—Go to step 5.

5. Check for an A/T system DTC.

Is there a DTC?

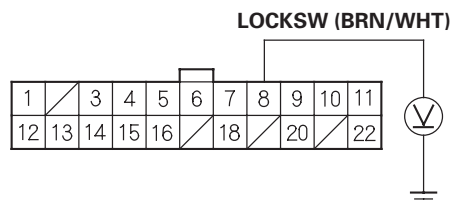
YES—Troubleshoot the A/T system indicated DTC. ■

NO—Go to step 6.

6. Turn the ignition switch OFF.
7. Disconnect the VTM-4 control unit connector A (22P).
8. Turn the ignition switch ON (II).

9. Connect a voltmeter between the A8 terminal of the VTM-4 control unit and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there battery voltage when the VTM-4 LOCK switch is pressed?

YES—Check for poor connections or loose terminals at the VTM-4 control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

NO—Go to step 10.

10. Test the VTM-4 LOCK switch (see page 15-49).

Is the VTM-4 LOCK switch OK?

YES—Repair open in the wire between the VTM-4 LOCK switch and the VTM-4 control unit (see page 15-50). ■

NO—Replace the VTM-4 LOCK switch. ■

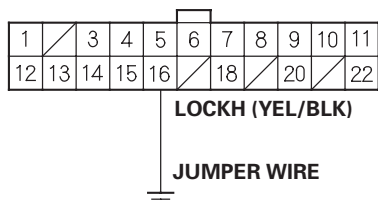
(cont'd)

Rear Differential

Symptom Troubleshooting (cont'd)

11. Connect the No. 16 terminal of the VTM-4 control unit connector A (22P) to body ground with a jumper wire.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

12. Watch the VTM-4 LOCK indicator.

Does the VTM-4 LOCK indicator come on?

YES—Check for poor connections or loose terminals at the VTM-4 control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

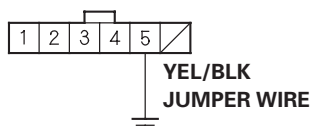
NO—Go to step 13.

13. Turn the ignition switch OFF.

14. Remove the VTM-4 LOCK switch.

15. Connect the No. 5 terminal of the VTM-4 LOCK switch 6P connector to body ground with a jumper wire.

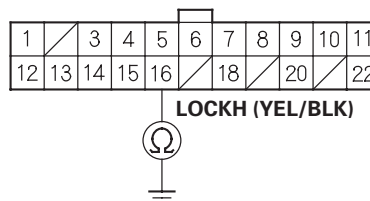
VTM-4 LOCK SWITCH 6P CONNECTOR



Wire side of female terminals

16. Check the continuity between the No. 16 terminal of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there continuity?

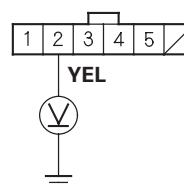
YES—Go to step 17.

NO—Repair open in the wire between the VTM-4 control unit (A16) and the VTM-4 LOCK switch. ■

17. Turn the ignition switch ON (II).

18. Measure voltage between the No. 2 terminal of the VTM-4 LOCK switch 6P connector and body ground.

VTM-4 LOCK SWITCH 6P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Replace the VTM-4 LOCK indicator bulb. ■

NO—Repair open in the wire between the No. 2 terminal of the VTM-4 LOCK switch 6P connector and the driver's under-dash fuse/relay box. ■



The VTM-4 LOCK indicator comes on when the ignition switch is turned ON (II) and does not go off

1. Disconnect the VTM-4 control unit connector A (22P).
2. Turn the ignition switch ON (II).
3. Watch the VTM-4 LOCK indicator.

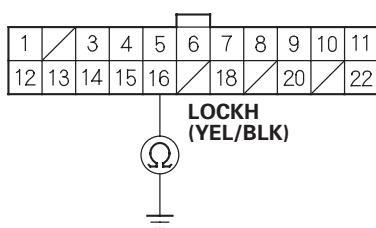
Does the VTM-4 LOCK indicator come on?

YES—Go to step 4.

NO—Check for poor connections or loose terminals at the VTM-4 control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■

4. Turn the ignition switch OFF.
5. Disconnect the VTM-4 LOCK switch 6P connector.
6. Check for continuity between the No. 16 terminal of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

Is there continuity?

YES—Repair short to ground in the wire between the VTM-4 control unit (A16) and the VTM-4 LOCK switch. ■

NO—Replace the VTM-4 LOCK switch (see page 15-49). ■

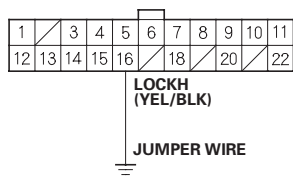
Rear Differential

Symptom Troubleshooting (cont'd)

The VTM-4 LOCK indicator does not come on for about 4 seconds when the ignition switch is turned ON (II)

1. Disconnect the VTM-4 control unit connector A (22P).
2. Turn the ignition switch ON (II).
3. Connect the No. 16 terminal of the VTM-4 control unit connector A (22P) to body ground with a jumper wire.

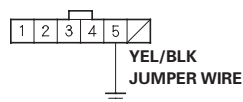
VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

4. Watch the VTM-4 LOCK indicator.
Does the VTM-4 LOCK indicator come on?
YES—Check for poor connections or loose terminals at the VTM-4 control unit connectors. If the connections are OK, replace the VTM-4 control unit (see page 15-50). ■
NO—Go to step 5.
5. Turn the ignition switch OFF.
6. Remove the VTM-4 LOCK switch.
7. Connect the No. 5 terminal of the VTM-4 LOCK switch 6P connector to body ground with a jumper wire.

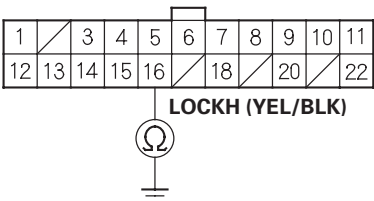
VTM-4 LOCK SWITCH 6P CONNECTOR



Wire side of female terminals

8. Check for continuity between the No. 16 terminal of the VTM-4 control unit connector A (22P) and body ground.

VTM-4 CONTROL UNIT CONNECTOR A (22P)



Wire side of female terminals

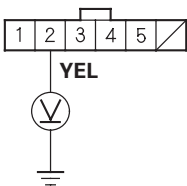
Is there continuity?

YES—Go to step 9.

NO—Repair open in the wire between the VTM-4 control unit (A16) and the VTM-4 LOCK switch. ■

9. Turn the ignition switch ON (II).
10. Measure voltage between the No. 2 terminal of the VTM-4 LOCK switch 6P connector and body ground.

VTM-4 LOCK SWITCH 6P CONNECTOR



Wire side of female terminals

Is there battery voltage?

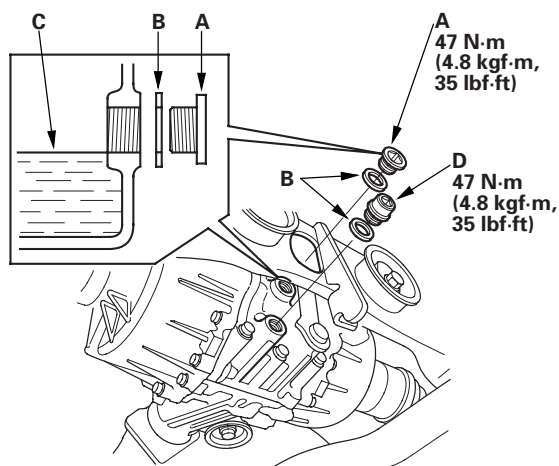
YES—Replace the VTM-4 LOCK indicator bulb. ■

NO—Repair open in the wire between the No. 2 terminal of the VTM-4 LOCK switch 6P connector and the driver's under-dash fuse/relay box. ■



Rear Differential Fluid Inspection and Replacement

1. With the vehicle on level ground, inspect the differential fluid with the ignition switch OFF.
2. Remove the oil filler plug (A) and sealing washer (B), then check the condition of the fluid, and make sure the fluid is at the proper level (C).



3. The fluid level must be up to the fill hole. If it is below the hole, add the recommended fluid until it runs out, then reinstall the oil filler plug with a new sealing washer.
4. If the differential fluid is dirty, remove the drain plug (D) and sealing washer (B), then drain the fluid.

5. Clean the drain plug, then reinstall with a new washer, and refill the differential with the recommended fluid to the proper level.

Fluid capacity:

2.64 L (2.79 US.qt) at fluid change

Recommended fluid:

VTM-4 Differential Fluid (P/N 0822-9003)

6. Reinstall the oil filler plug with a new washer.

Rear Differential

Rear Differential Function Test

NOTE: Before doing the Differential Function Test, the following conditions must be present.

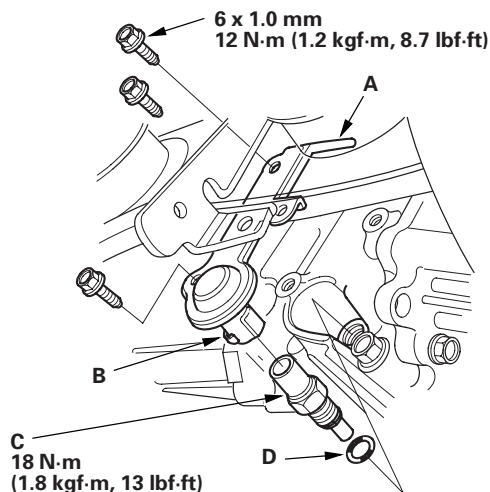
- No DTCs detected
- Engine is OFF
- The VTM-4 control unit must be initialized

1. Connect the HDS to the data link connector (DLC).
2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the VTM-4 control unit. If it doesn't go to the DLC circuit troubleshooting (see page 11-194).
4. Confirm that the temperature of the differential oil is between 68 °F (20 °C) and 140 °F (60 °C) with the HDS.
5. Turn the ignition switch OFF with the shift lever in P.
6. Raise the vehicle so all four wheels are off the ground, and make sure the vehicle is securely supported (see page 1-10).
7. Remove the rear wheels (see page 18-28).
8. Release the parking brake.
9. Turn the ignition switch ON (II).
10. Select MISCELLANEOUS TEST, then select the LEFT CLUTCH ELECTROMAGNETIC COIL TEST with the HDS, and follow the screen prompts. If the results are NORMAL, the left clutch is OK, go to step 11. If the results are ABNORMAL, replace the rear differential.
11. Select MISCELLANEOUS TEST, then select the RIGHT CLUTCH ELECTROMAGNETIC COIL TEST with the HDS, and follow the screen prompts. If the results are NORMAL, the right clutch is OK. If the results are ABNORMAL, replace the rear differential.



Rear Differential Fluid Temperature Sensor Replacement

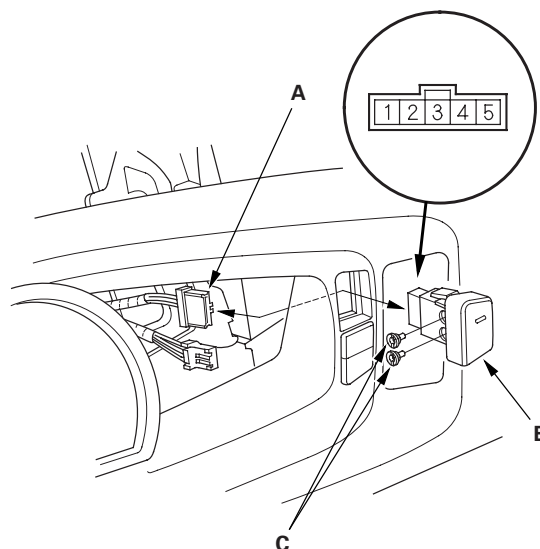
1. Remove the wire harness cover (A), then disconnect the differential oil temperature sensor 2P connector (B).



2. Remove the differential oil temperature sensor (C).
3. Install the differential oil temperature sensor in the reverse order of removal, with a new O-ring (D).

VTM-4 LOCK Switch Test/Replacement

1. Remove the instrument panel (see page 20-81).
2. Disconnect the 5P connector (A) from the VTM-4 LOCK switch (B), then remove the VTM-4 LOCK switch.



3. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3	4	5
Release the switch		○	○	○	○
Press the switch	○	○	○	○	○

4. If the continuity check is not as specified, replace the bulbs (C) or the VTM-4 LOCK switch.

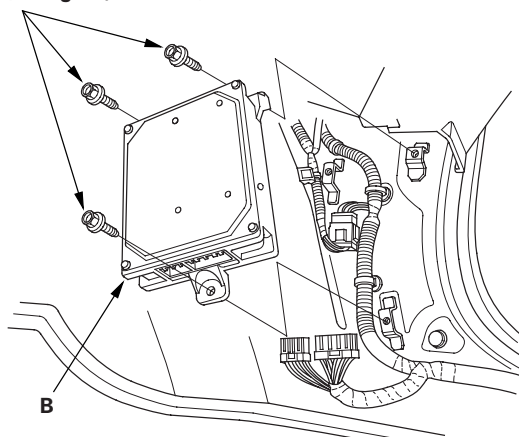
Rear Differential

VTM-4 Control Unit Replacement

NOTE: The VTM-4 control unit must be initialized (see page 15-5) after replacement, otherwise the 4WD system will not function.

1. Remove the right side kick panel (see page 20-60).
2. Remove the three bolts (A) from the VTM-4 control unit (B).

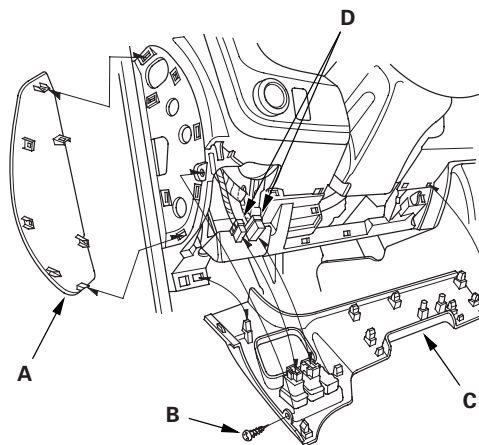
A
12 N·m
(1.2 kgf·m, 8.7 lbf·ft)



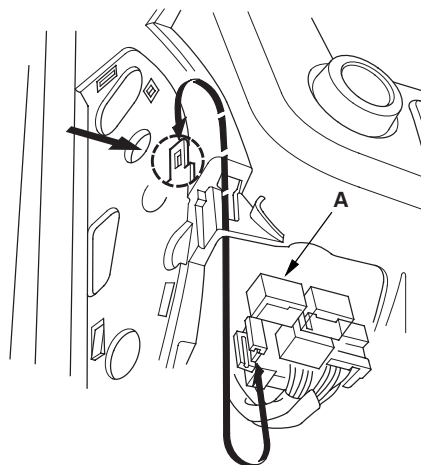
3. Disconnect the VTM-4 control unit connectors.
4. Install the VTM-4 control unit in the reverse order of removal.

VTM-4 Relay Replacement

1. Remove the instrument side panel (A) and the screw (B).



2. Remove the instrument under panel (C) and the connectors (D).
3. Remove the VTM-4 relay (A).

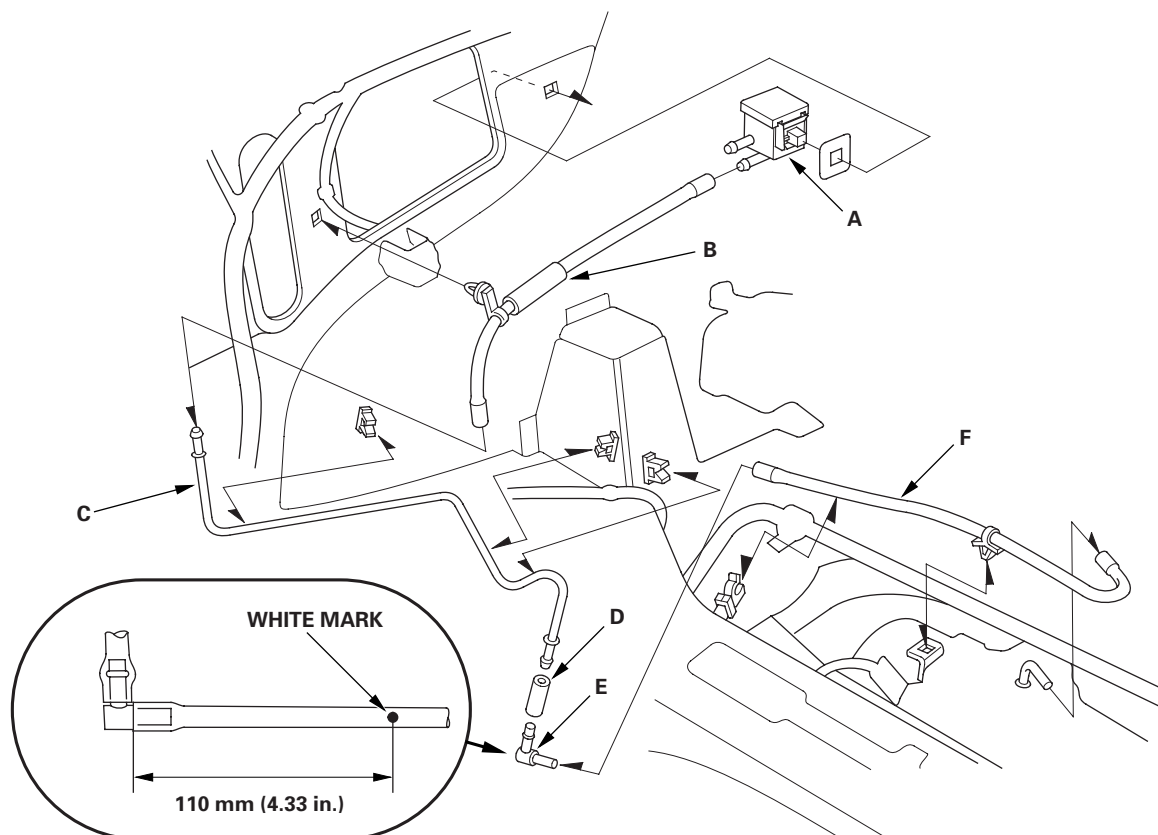


4. Install the VTM-4 relay in the reverse order of removal.



Rear Differential Breather, Line, and Hose Replacement

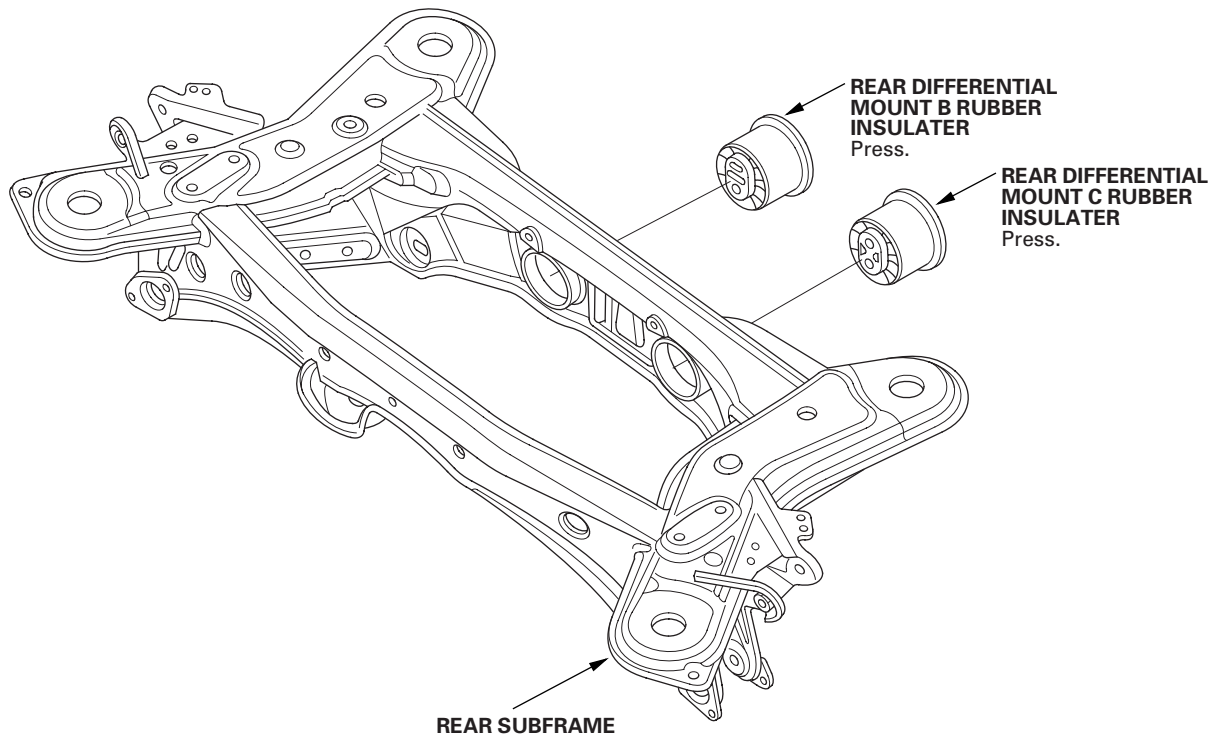
1. Remove the left side bed panel (see page 20-162).
2. Remove the bed floor panel (see page 20-163).
3. Remove the breather (A) and the line (C), then remove the hoses (B, D, F).



4. Connect and install the breather (A) and the hose (B).
5. Clamp the line (C) into place, then connect it to the upper hose (B).
6. Connect the breather joint (E) to the line (C) with the short hose (D).
7. Connect the joint to the lower hose (F), then connect the hose to the differential.
8. Make sure that all the hoses are properly routed, clipped into place, and not pinched.

Rear Differential

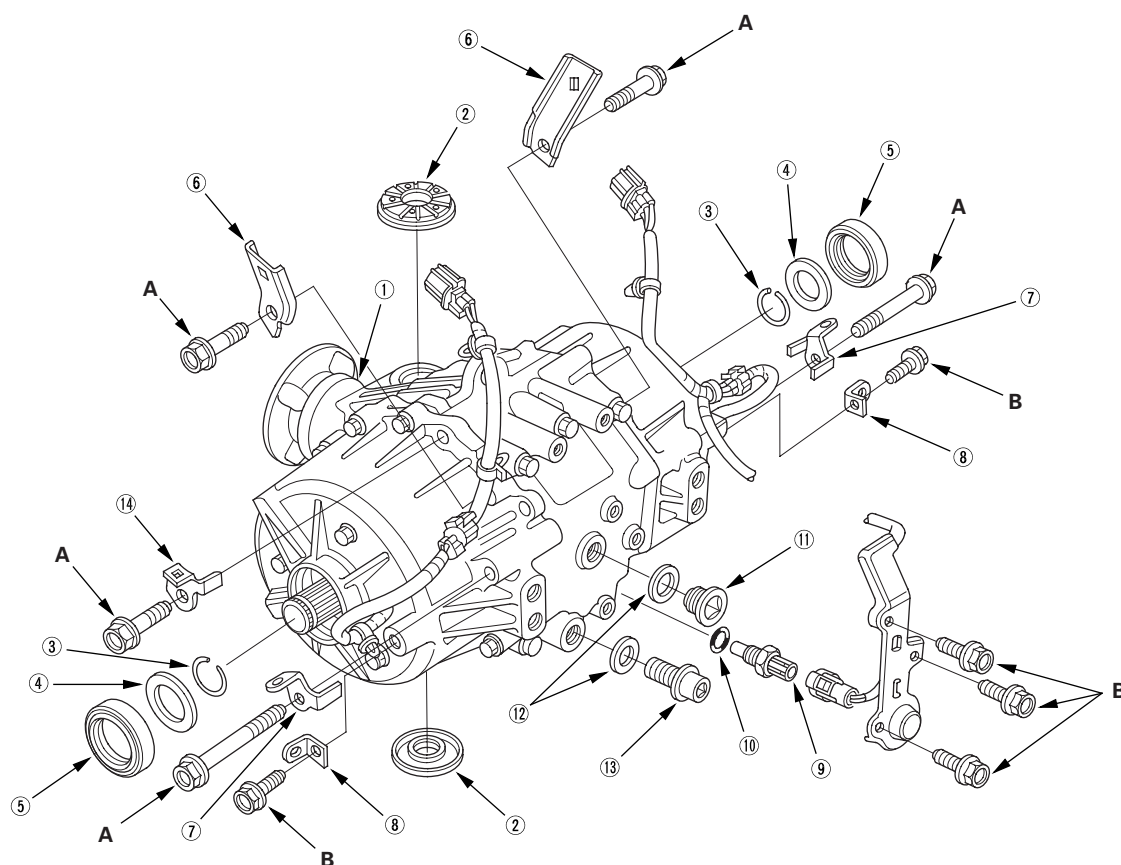
Rear Differential Mount Replacement





Rear Differential Removal

Exploded View



A: 27 N·m (2.8 kgf·m, 20 lbf·ft)

B: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

① REAR DIFFERENTIAL CARRIER ASSEMBLY

② REAR DIFFERENTIAL MOUNT A RUBBER INSULATOR

③ SET RING
Replace.

④ THRUST WASHER
Replace.

⑤ HALF SHAFT OUTER SEAL
Replace.

⑥ REAR DIFFERENTIAL HARNESS BRACKET A

⑦ REAR DIFFERENTIAL CABLE BRACKET C

⑧ REAR DIFFERENTIAL CABLE BRACKET F

⑨ DIFFERENTIAL OIL TEMPERATURE SENSOR

⑩ O-RING
Replace.

⑪ FILLER PLUG
47 N·m (4.8 kgf·m, 35 lbf·ft)

⑫ SEALING WASHER
Replace.

⑬ DRAIN PLUG
47 N·m (4.8 kgf·m, 35 lbf·ft)

⑭ REAR DIFFERENTIAL HARNESS BRACKET B

(cont'd)

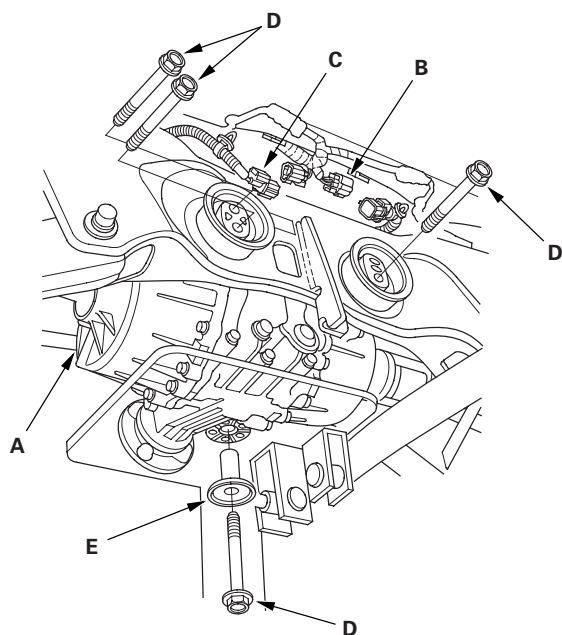
Rear Differential

Rear Differential Removal (cont'd)

Special Tools Required

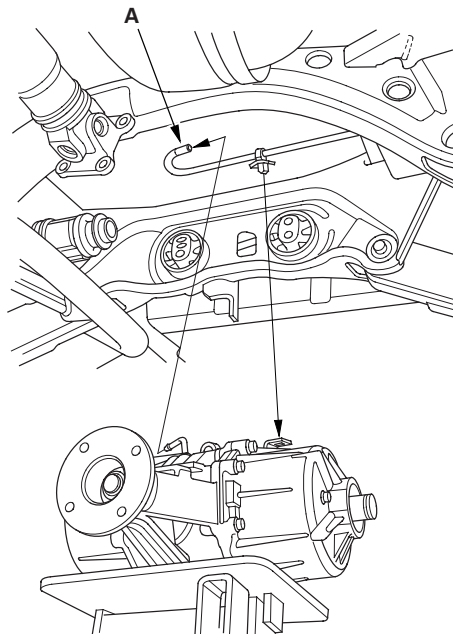
Driveshaft remover 07AAD-S9VA000

1. Drain the differential fluid (see page 15-47).
2. Make a reference mark across the propeller shaft, the transfer, and the rear differential, then remove the propeller shaft (see page 16-40).
3. Remove the rear driveshaft (see page 16-24).
4. Place a transmission jack under the rear differential (A).



5. Disconnect the 6P (B) and 2P (C) connectors, then remove the mounting bolts (D) and washer (E).

6. Lower the rear differential a little on the transmission jack.



7. Disconnect the breather hose (B) from the rear differential.
8. Lower the rear differential on the transmission jack.

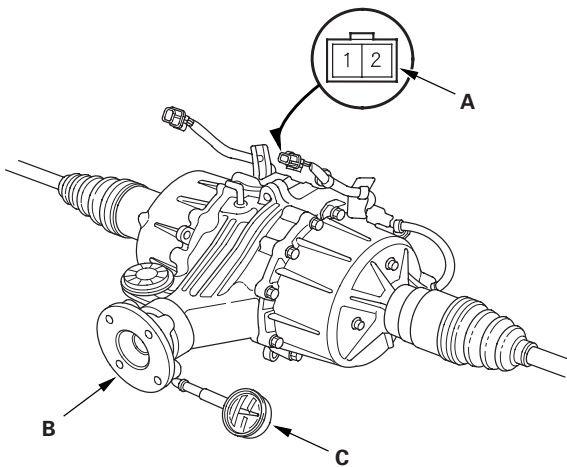


Backlash Inspection

NOTICE

Connecting battery voltage to either the right or left clutch electromagnetic coils for more than 3 minutes will damage the rear differential.

1. Install the left rear driveshaft, then connect the battery power to the No. 1 terminal of the left clutch electromagnetic coil 2P connector (A) and ground to the No. 2 terminal.



2. Check the backlash of the companion flange (B) with a dial indicator (C).

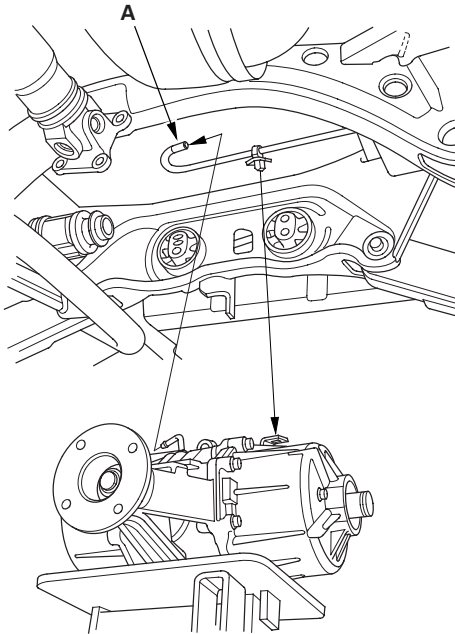
Standard: 1.23—2.38 mm (0.048—0.094 in.)

3. If the backlash is out of standard, replace the rear differential.

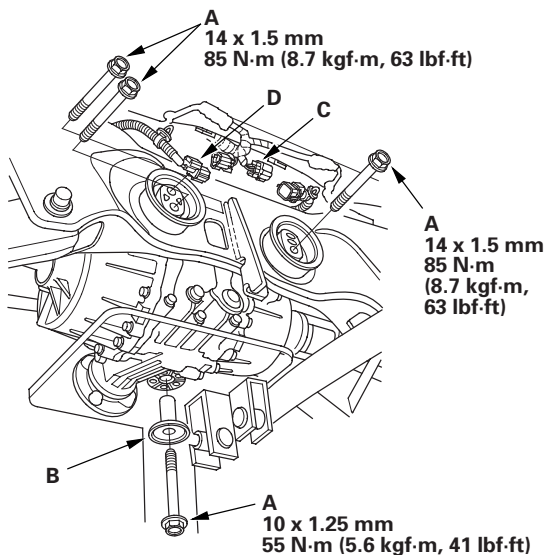
Rear Differential

Rear Differential Installation

1. Raise the rear differential a little on the transmission jack, then connect the breather tube (A) to the rear differential.



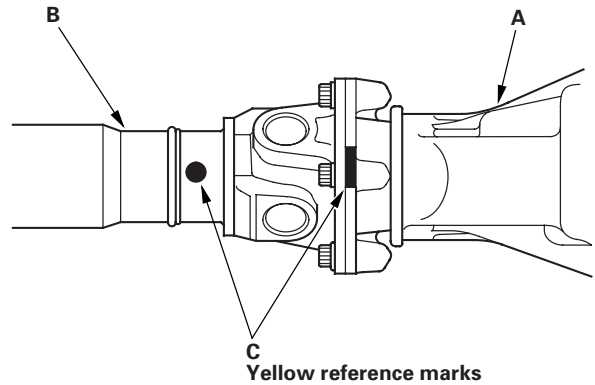
2. Raise the rear differential to the mounting level, then install the mounting bolts (A) and washer (B).



3. Connect the 6P (C) and 2P (D) connectors.

4. Install the rear driveshaft (see page 16-36).

5. Install the new rear differential (A) onto the propeller shaft (B), by aligning the reference mark (C). Make sure you use new mounting bolts.



6. Attach the propeller shaft to the transfer and the rear differential by aligning the reference marks (see page 16-41).

7. Refill the differential with recommended fluid (see page 15-47).